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CHEMICAL BIOLOGICAL AND PHYSICAL MEASUREMENTS FROM THE  
SUBTROPICAL WESTERN (U) NAVAL OCEAN RESEARCH AND  
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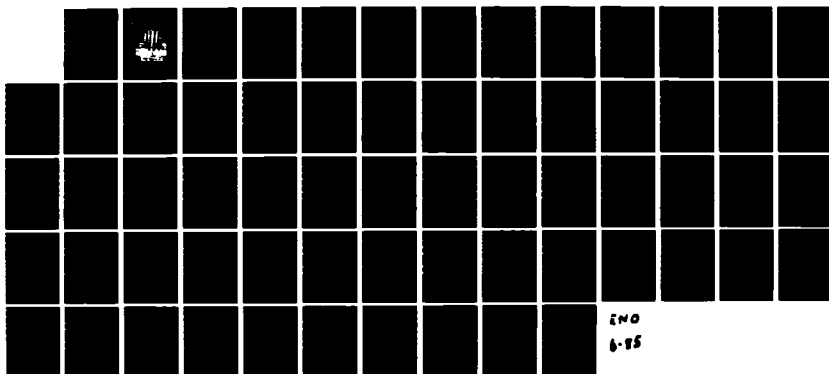
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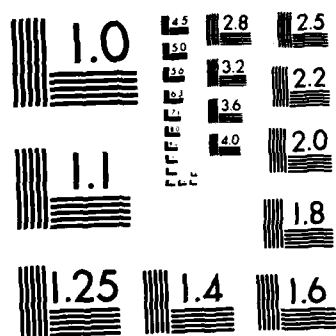
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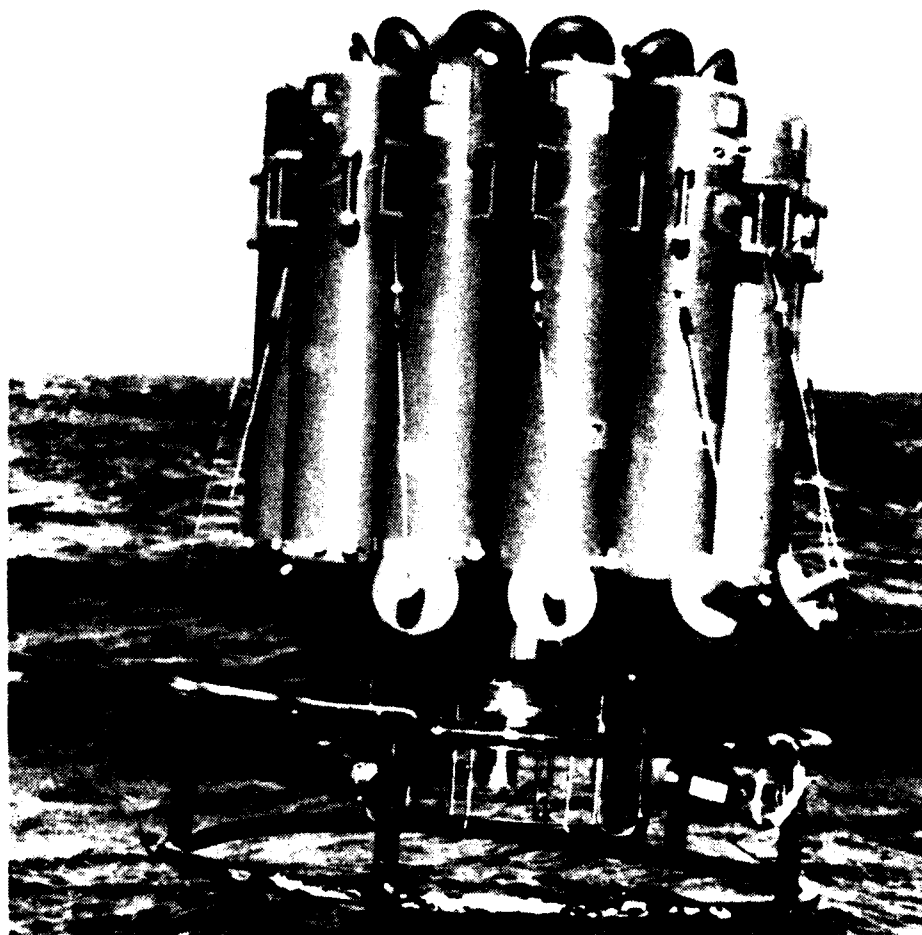
Naval Ocean Research and  
Development Activity  
NSTL, Mississippi 39529



# Chemical, Biological, and Physical Measurements from the Subtropical Western North Atlantic Ocean

Summer 1982, USNS LYNCH, Cruise 710-82

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The cover photo shows the large volume Rosette-CTD system used to collect the data used in this technical note.

# ABSTRACT

Several years ago the Naval Ocean Research and Development Activity initiated a project to examine the interrelationships between dissolved trace gases and suspended particulate material in the upper water column of the world oceans. The goal of the project was to observe and understand the variations in biological parameters, gas distributions and suspended particulate layers to provide an assessment of in situ gas production mechanisms associated with particulate material.

This report is a summary of data collected in the western North Atlantic Ocean in the summer of 1982 aboard USNS LYNCH, Cruise 710-82. Vertical profiles through most of the water column were obtained for the following parameters: conductivity, temperature, salinity, nephelometry, transmissometry, total suspended matter, dissolved and particulate organic carbon, adenosine triphosphate (ATP), chlorophyll and phaeopigments, nutrients (nitrate, nitrite, ammonium, phosphate, silicate), dissolved oxygen and dissolved reduced gases (methane and nitrous oxide). Tables of the measured and certain derived parameters are given, along with descriptions of the collection and analytical procedures.

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## ACKNOWLEDGMENTS

The authors wish to thank Captain L. Clausen and the crew of the USNS LYNCH for their efforts to make Cruise 710-82 a successful field experiment. We also thank J. T. Kirby, electronic technician, Naval Oceanographic Office, NSTL, Mississippi, for keeping our instruments alive during the cruise. Special thanks are due to Ms. Stephanie A. Briggs who laborously analyzed all the DOC, POC, and ATP samples and to Ms. Janet Watkins who tabulated the data. This work was funded by the Naval Ocean Research and Development Activity under Program Element 61153N, Herbert C. Eppert, Jr., program manager.

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# CHEMICAL, BIOLOGICAL AND PHYSICAL MEASUREMENTS FROM THE SUBTROPICAL WESTERN NORTH ATLANTIC OCEAN, JUNE 1982

## INTRODUCTION

The Naval Ocean Research and Development Activity (NORDA) Dissolved Gas/Nephelometry Program represents an attempt to assess the importance of suspended particulate material in surface waters in influencing the production of dissolved trace gases. This program was initiated by NORDA Code 333 (Biological and Chemical Oceanography Branch) and undertaken in conjunction with two research groups from Texas A&M University. The field experiments for this program were designed to study the relationships between near-surface nepheloid (suspended particle) layers and dissolved reduced gases in the open ocean. This technical note constitutes a preliminary data report from a cruise in the subtropical western North Atlantic Ocean during June 1982. The cruise (USNS LYNCH, 710-82) was conducted as part of the final phase of the field program in which we sought to (1) examine several oceanic regions to determine the generality of the occurrence of the reduced gases methane ( $\text{CH}_4$ ), hydrogen ( $\text{H}_2$ ), and nitrous oxide ( $\text{N}_2\text{O}$ ) in the oxygenated, near-surface layers of the open ocean, and (2) examine a wide range of physical, chemical, and biological parameters in an effort to establish relationships with these gases. The ultimate goal is to identify the in situ sources and sinks for these gases in oceanic near-surface waters. This report describes the collection and analytical procedures used and presents tables of the measured and derived parameters.

## Cruise Description

The field exercise was conducted aboard the USNS LYNCH, Cruise 710-82, which departed NOB Norfolk, Virginia, on 01 June 1982 and docked at NOB Norfolk, Virginia, on 28 June 1982. Between 01 June and 28 June, 22 stations were successfully completed through the Gulf Stream and the subtropical, western North Atlantic Ocean, plus one just outside the mouth of Chesapeake Bay (see Figure 1). Cruise participants and their collection and/or analytical responsibilities are listed in Table 1.

## METHODS

### Field Data Collection and Sample Location

Water samples, hydrographic data (conductivity, temperature, and pressure) and optical data (light transmission, nephelometry or fluorometry) were obtained using a Neil Brown Instrument Systems, Inc. MARK IIIB CTD System in conjunction with a General Oceanics, Inc. Rosette Sampler adapted to hold twelve 30-liter non-metallic water samplers (Niskin bottles). The CTD system had been modified by the addition of an extra data channel that digitizes a 0-5 Volt DC analog signal from an external sensor and transmits it as part of the normal CTD data cycle. The optical sensor (either a SeaMarTek, Inc. nephelometer/fluorometer or a Sea Tech, Inc. 25-cm transmissometer) was interfaced to the CTD system via this extra channel. Prior to each cruise, the CTD system was calibrated and operationally checked by the Sensor Calibration Lab of the U.S. Naval Oceanographic Office. Thus, at the beginning of each cruise the CTD is certified to be operating within the manufacturer's specified accuracies. Beginning in 1982 the calibration was routinely based on the PSS78 Practical Salinity Scale.



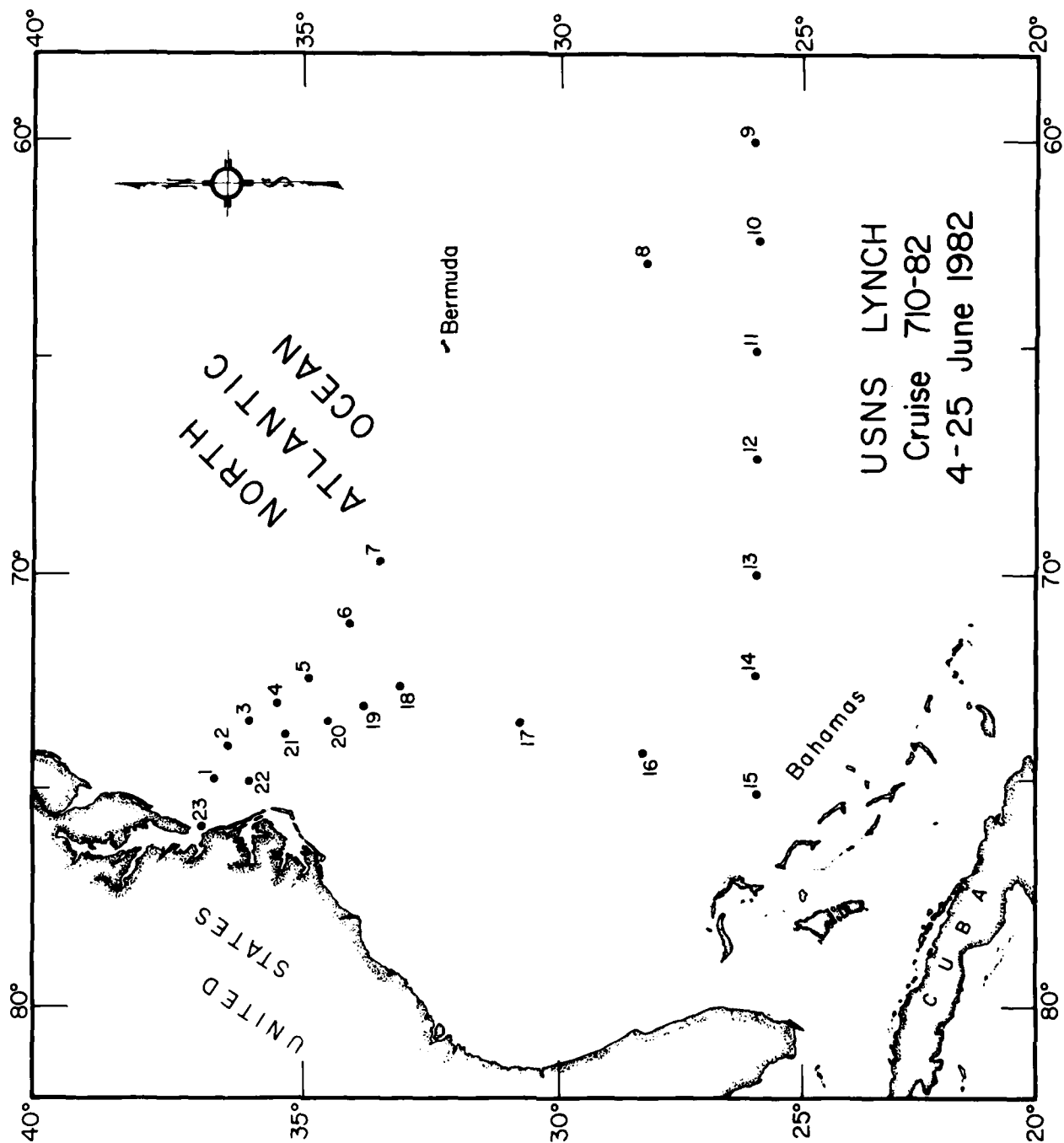


Figure 1. Station location map USNS LYNCH cruise 710-82.

TABLE 1. SCIENTIFIC PARTY, USNS LYNCH, CRUISE 710-82, 01-28 JUNE 1982

Name	Affiliation	Principal Responsibility
Reid, David F.	NORDA <sup>1</sup>	CTD/Nephelometry; Chief Scientist
Andryszak, Nancy A.	TAMU <sup>2</sup>	Methane, Nitrous Oxide
Cox, Benjamin	TAMU	Methane, Nitrous Oxide
Davis, Kimberley G.	Old Dominion <sup>3</sup>	Dissolved Oxygen
DePalma, Irene P.	NORDA	TSM, Chlorophyll analysis, ATP analysis
Fay, Roger R.	TAMU	Methane, Nitrous Oxide
Guffy, J. Dennis	TAMU	Nutrients
Lavoie, Dennis M.	NORDA	ATP sample preparation
LaRock, Paul A.	Florida State <sup>4</sup>	Microbiology
Merrill, Elizabeth G.	Old Dominion	Salinity, POC
Schwarz, John R.	TAMU-Galveston <sup>5</sup>	Microbiology
Shropp, Steven J.	TAMU-Galveston	Microbiology
Velinsky, David	Old Dominion	DOC and POC
Wiesenburg, Denis A.	NORDA	Hydrogen

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<sup>2</sup>Texas A&M University, College Station, Texas

<sup>3</sup>Old Dominion University, Norfolk, Virginia

<sup>4</sup>Florida State University, Tallahassee, Florida

<sup>5</sup>Texas A&M University, Galveston, Texas

On each chemical station, the CTD-Rosette package was deployed from the starboard hydrographic winch on a single conductor oceanographic cable (1H0250) electronically interfaced to the CTD readout/data logging system. As the 2 m high, 900 lb package was lowered through the water column (downcast), the serial data transmissions from the CTD are recorded on analog tape and also digitized in 0.5-1 decibar (dbar) averages and stored on digital tape. At a lowering speed of 40 m per minute the 0.5-dbar increments usually represent the average of at least three data cycles. The strategy for obtaining water samples is determined by examining the data obtained during the downcast.

Water samples were collected on the upcast by halting the CTD package at the desired depth or hydrographic feature and electronically triggering the Rosette Sampler, which closes one Niskin bottle per triggering cycle. Before and after each bottle closure the CTD readings were recorded. When the CTD-rosette package arrived on deck, salinity samples were obtained for comparison with the CTD data. Beginning in 1982 the salinometer salinities were routinely based on the PSS78 Practical Salinity Scale.

In order to fix the sample position in the water column, the data record from each cast was listed and the data corrected for sensor offsets, if any. The requirement for a correction was determined from postcruise calibration data and/or comparison of the CTD based salinities with actual salinities measured in the field. It has been the experience of the Sensor Calibration Lab of the U. S. Naval Oceanographic Office that NBIS CTD Systems are extremely stable and usually do not drift "out of specification" over the relatively short time span that typically passes between precruise calibration and our use in the field (usually 2-3 months maximum), especially if the sensors are routinely cleaned before each station as we did. On the other hand, the accuracy of the Autosol is dependent on environmental conditions and operator ability. Therefore, when data from a postcruise CTD calibration check are available, the CTD digital data are corrected based on the postcruise calibration results. The corrected CTD data are then used to check for evidence of a constant offset between the CTD salinities (now assumed to be accurate) and the measured salinities. If a constant offset in the measured salinities is found, they are corrected based on the CTD records. When no postcruise calibration data are available, the CTD field data are compared against the measured salinities and against historical data from the field location and appropriate corrections are made.

Once the CTD and salinometer salinity data have been compared and corrected, the actual or "accepted" sample depth is determined by comparing the individual sample salinity, as measured aboard ship, against the corrected serial CTD data list. First, the CTD readings logged before and after each Rosette triggering sequence are compared with the corrected CTD data list. The pressure interval over which the before and after conductivity and temperature values occur is identified. Then the salinities in the vicinity of the identified pressure interval are compared with the measured sample salinity for a match. The pressure, temperature, and optical data from the same level as the matching salinities are then chosen as the accepted values for the sample. In case of no match, which would indicate that the water sampler did not close where it was intended (e.g., pre- or posttrip), other data such as dissolved oxygen, nutrients and comparison with hydrographic data from water samplers immediately adjacent to the suspect sample were used to identify the probable depth of closure. Salinity was then used for confirmation, and a judgment was made as to whether the out-of-place sample may still be used.

Our experience with the methods described above show that in most cases a reasonably straightforward match is found at or quite near the expected sample depth, and misfires of the Rosette system are easy to identify, especially when additional chemical data are used along with the salinity.

#### Water Samples Collection and Analytical Methods

Once the CTD-rosette system was on deck, water samples were drawn from the Niskin bottles as appropriate to the lability of the parameters being measured, with gas samples being drawn first. To provide profile detail in the shallow zone, the most intense sampling was done in the upper 500 m region. At many stations, day and night casts were undertaken to assess potential diurnal variability of trace gases and related parameters. All times are reported as GMT. Local time was GMT-4 hr.

The following parameters were measured or calculated on board:

- conductivity,
- in situ temperature,
- pressure,
- depth,
- CTD salinity,
- Niskin sample salinity,
- nephelometry (light scattering at 90°),
- transmissometry (25-cm light attenuation at 640 nm),
- nutrients ( $\text{NO}_2^-$ ,  $\text{NO}_3^+$ ,  $\text{NH}_4^+$ ,  $\text{PO}_4^+$ ,  $\text{Si(OH)}_4$ ), and
- dissolved gases  $\text{O}_2$ ,  $\text{CH}_4$ , and  $\text{N}_2\text{O}$ .

The NORDA hydrogen measurement system was not operable due to equipment breakdown, thus no  $\text{H}_2$  determinations were made. The following parameters were measured or calculated from samples or data brought back to the laboratory. Special collection procedures, as well as the essential elements of the analytical methods, are described below:

- potential temperature,
- sigma-t,
- total suspended matter (TSM),
- dissolved and particulate organic carbon (DOC AND POC),
- chlorophyll and phaeopigments (chlorophyll degradation products), and
- adenosine triphosphate (ATP, a measure of living biomass).

1. METHANE AND NITROUS OXIDE. Care was taken to prevent the introduction or trapping of air in the collection bottle. The glass sample collection bottle was filled from the bottom using a piece of plastic tubing fitted to the Niskin bottle drain cock, allowed to overflow, and capped quickly and carefully. Analysis was begun immediately using the method of Brooks, Reid and Bernard (1981).

In its essentials, the analytical method for  $\text{CH}_4$  and  $\text{N}_2\text{O}$  analysis consists of first separating and concentrating the dissolved gases by bubbling pure helium through the sample in a closed purging loop. The purged gases are trapped in a liquid  $\text{N}_2$ -cooled tube containing molecular sieve. Subsequently, the gases are

released from the trap by heating to 100°C and are flushed with helium through a gas chromatograph fitted with a flame ionization detector (for CH<sub>4</sub>) or an electron capture detector (for N<sub>2</sub>O). Calibration was accomplished using standard gas mixtures; precision of the method is approximately 5.5% and the detection limit 0.2 nanoliter/liter (nl/l). Duplicate analyses were performed for each gas at each depth.

2. OXYGEN. Calibrated, 125-ml glass flasks for dissolved oxygen sampling were rinsed twice with the seawater sample, then gently filled from the bottom using a short length of plastic tubing attached to the Niskin bottle drain cock. After allowing the flask to overflow copiously, a glass stopper having a conical end to displace contaminating air bubbles was inserted.

A modified (micro) version of the standard Winkler titration was used to analyze for dissolved oxygen (Carpenter, 1965; U.S. Naval Oceanographic Office, 1970). The tabulated values are the average of duplicate determinations.

3. TSM. A separate hydrocast, consisting of twelve 30-l Niskin bottles, was used to collect water for total suspended matter (TSM). These bottles were fitted with special taps threaded into the bottom edge to enable all the water to be drained. A short piece of plastic tubing connected each tap to a 47-mm diameter in-line filter holder (Nuclepore Corp., Pleasanton, California); this in turn was connected to a catch jug that was maintained under continuous vacuum. Each filter holder contained a tared 0.4-micrometer ( $\mu$ m) pore size Nuclepore filter.

Vacuum filtration of the seawater proceeded until either all the water was drained from the Niskin bottle or the filter clogged. Salt was removed from the filter by injecting 30 ml of filtered, distilled water into the filter holder and applying suction until the filter was dry. The filter was then placed in a 47-mm plastic culture dish (Millipore Corp., Bedford, Massachusetts), desiccated overnight, and sealed with tape. "Blank" filters were loaded, rinsed, unloaded and stored along with the test filters, but no seawater was passed through them. The volume of seawater passed through each filter was measured in the catch jugs using a calibrated dipstick. Loading and unloading of the filter membranes from the holders was done in a down-draft, laminar-air-flow hood.

In the laboratory, the filter membranes were weighed to the nearest microgram ( $\mu$ g) on a digital Cahn Electrobalance (Cahn Instrument Co., Cerritos, California). Although they load up more quickly, Nuclepore filters are readily washed of salts and are not subject to the hydration problems associated with membrane filters or the fraying problems of glass fiber filters. The polycarbonate filters do tend to be prone to electrostatic effects, but this problem can be controlled by maintaining moderate humidity ( $\approx$ 70%) and using an ionization source in the weighing chamber. Single measurements were made at each depth.

4. DOC AND POC. Preparation of materials and analytical procedures generally followed those of Strickland and Parsons (1972) with some modifications. Calibrated, 1-l glass reagent bottles were rinsed and filled with the sample. Particulate and dissolved organic carbon fractions were obtained simultaneously with an in-line system: the sea water was drawn up a glass siphon tube placed in the sample bottle and through a precombusted 25-mm diameter glass-fiber filter (GF/C, Whatman

Inc., Clifton, New Jersey) mounted in a polycarbonate in-line holder (Nuclepore Corp.) attached to the top of the tube. The filtrate was then drawn into a 250-ml side arm flask from which it overflowed into the vacuum reservoir/waste receptacle. The filter was analyzed for particulate organic carbon (POC), and the filtrate remaining in the 250-ml flask was analyzed for dissolved organic carbon (DOC). Duplicate sample bottles were taken so that duplicate POC determinations could be made, and three replicate samples for DOC determinations were drawn by glass syringe from one of the 250-ml flasks. Reagents were added to the DOC ampules as per Strickland and Parsons (1972), but for the POC ampules, the water, persulfate and acid were premixed 8 hr before use for convenience and to minimize the reagent blank. This reagent solution was dispensed using an all-glass and Teflon Repipettor (Oxford Instruments Inc., Columbia, Maryland). The ampules were sealed using an Oceanography International Corporation (OIC, College Station, Texas) Sealing/Purging Unit and were packed for transport.

In the laboratory, the ampules were cooked at 100°C overnight to complete digestion of the organic material to carbon dioxide and analyzed by infrared adsorption on an OIC Carbon Analyzer. Standards were run at the beginning and end of each sample set using oxalic acid dilutions prepared in ampules. The standard curve was best fitted by a quadratic equation to account for nonlinearity at the low end of the range of concentrations encountered. Blanks on standards and samples were run according to Strickland and Parsons (1972).

On shipboard, the processing of filters and ampules was done in a downdraft, laminar-air-flow hood to minimize contamination.

5. CHLOROPHYLL AND PHAEOPHYTIN. Pigment samples were drawn into rinsed, calibrated 1 liter, brown plastic bottles, and filtered and stored according to Strickland and Parsons (1972). Duplicate samples of the total phytoplankton pigment were filtered at each depth.

The filters, stored at -20°C in a desiccator, were transported to the laboratory at the end of the cruise, and the pigments extracted by grinding and steeping in neutral 90% acetone approximately 4 to 6 hr. Chlorophyll "a" and phaeophytin were measured after Strickland and Parsons (1972) using a Turner Designs Model 000-10 Fluorometer (Turner Designs, Mountain View, California).

6. ATP. Seawater was drained through a 200- $\mu$ m mesh nylon screen into rinsed, brown plastic, 500-ml bottles, two bottles for each depth. The contents of one bottle were passed through 20- $\mu$ m mesh nylon screen onto a 2- $\mu$ m pore size Nuclepore filter to obtain particles between 20 and 2  $\mu$ m. The contents of the other bottle were passed through a 2- $\mu$ m filter without prefiltering through the nylon mesh to yield particles between 200 and 2  $\mu$ m. This filtrate was caught in a clean flask below and was in turn passed through a 0.2- $\mu$ m filter to yield a 2- to 0.2- $\mu$ m fraction. Since each sample bottle was actually split into two 250-ml aliquots, the resulting sample set comprised duplicate filtrations of each of the three size fractions at each depth.

ATP values for two other size fractions were obtained by adding the results of the 200- to 2- $\mu$ m fraction and the 2- to 0.2- $\mu$ m fractions to yield a "total" ATP (200- to 0.2- $\mu$ m) and by subtracting the results of the 20- to 2- $\mu$ m from the 200- to 2- $\mu$ m fraction to yield the 200- to 20- $\mu$ m fraction. The names assigned to the different fractions--"micro" for 200 to 20  $\mu$ m, "nano" for 20 to 2  $\mu$ m, and "pico" for 2 to 0.2  $\mu$ m--follow the eminently logical terminology proposed by Sieburth,

Smetacek, and Lenz (1978) and correspond to the traditional approximate terms "net plankton," "ultra" or "nano" plankton (mostly flagellates), and "bacterioplankton."

ATP was extracted from the particles on the filters by the method of Holm-Hansen and Booth (1966): as soon as the last of the seawater passed through it, the filter was removed from the filter holder and plunged into 5 ml of boiling Tris buffer (0.05M, tris hydroxyaminomethane at pH 7.8) contained in a 20-ml scintillation vial and boiled for at least 3 min. Procedural blanks were obtained by extracting filters taken straight from the box.

The extracts and filters were cooled and frozen in the vials and maintained at -20°C until analysis at the laboratory, where they were gently thawed and brought to the original 5-ml volume with "low response" water (i.e., water purified by ion exchange and reverse osmosis, neutralized with NaOH, and tested for ATP activity). Analysis was accomplished by injecting 200  $\mu$ l of sample into 100  $\mu$ l of purified luciferin-luciferase system (DuPont Inc., Wilmington, Delaware). The resulting light emission was measured in a sensitive photometer (SAI Inc., San Diego, California), after a 10-sec delay, by integrating the area under the reaction decay curve for 30 sec. From two to four injections were made of each extract, so that each data point represents a minimum of duplicate determinations on each of two replicate filtration/extractions. Standards were made with "low response" water and pure Na-ATP salt (Sigma Chem. Corp., St. Louis, Missouri). Both blank and unknown concentrations were normalized to 5 ml before correcting for the blank and extrapolating back to the seawater concentration.

7. NUTRIENTS. Samples were drawn into clean, hard plastic bottles and analyzed immediately in duplicate. Sample preparation followed Strickland and Parsons (1972) and analysis was performed using a Technicon Auto Analyzer (Technicon Instruments Corp., Tarrytown, New York).

## RESULTS

Table 2 provides complete summary data on each CTD station and cast. Date, time, location, type of cast, external sensor and number of water samples taken (ST) are provided for each cast. The water sample data tables for each station and cast are reported in Appendix A.

The following comments apply to the data tables:

1. Where a blank appears, no data were reported; where a zero appears, the parameter was below detectable limits.

2. Nutrient, CH<sub>4</sub> and N<sub>2</sub>O data were supplied by Dr. James M. Brooks and Dr. Roger F. Fay of Texas A&M University. Their permission to include their data here is gratefully acknowledged.

3. The salinity measured with the CTD and the reported salinity (i.e., that measured from Niskin bottle sample on board) do not often agree exactly, even though the CTD sensors had been precisely calibrated and the CTD salinity was calculated from digital data recorded while the bottle was being tripped (a process requiring some 30 sec). The discrepancy can be accounted for by three factors: (1) the CTD sensors and the Niskin bottles were separated on the frame by approximately 1 m; (2) this separation was probably significant in terms of the scales of conduc-

Table 2. Station and location description USNS LYNCH 710-82

STATION	CAST	CAST TYPE	ST	DATE	TIME	LATITUDE	LONGITUDE	SENSOR
1	1	Chemical	6	05 June 82	1137	36 42.5 N	074 46.2 W	Transm
2	1	Chemical	12	05 June 82	1740	36 28.0 N	074 03.0 W	Transm
2	2		0	05 June 82	1930	36 28.0 N	074 03.0 W	Fluor2
2	3		0	05 June 82	1950	36 28.3 N	073 58.7 W	Fluor4
3	1	Fluoromet	0	06 June 82	0230	36 01.2 N	073 26.9 W	Fluor4
3	2	Transmiss	12	06 June 82	0330	36 06.4 N	073 22.0 W	Transm
3	3	Nephelome	0	06 June 82	0700	36 05.1 N	073 20.7 W	Nephe3
4	1		0	06 June 82	1400	35 30.0 N	073 00.0 W	Nephe3
4	2	LaRock	12	06 June 82	1800	35 31.1 N	072 56.2 W	Nephe3
4	3	Chemical	12	06 June 82	2030	35 31.0 N	072 54.0 W	Transm
5	1		0	07 June 82	0900	35 01.0 N	072 30.6 W	Nephe3
5	2		0	07 June 82	1000	35 00.0 N	072 30.0 W	Fluor6
5	3	Chemical	10	07 June 82	1100	35 00.0 N	072 31.2 W	Transm
6	1		0	07 June 82	2230	34 15.5 N	071 10.8 W	Transm
6	2	Fluoromet	0	07 June 82	2340	34 15.0 N	071 13.0 W	Fluor7
6	3	Fluoromet	0	08 June 82	0010	34 15.0 N	071 13.0 W	Fluor6
6	4	Nephelome	12	08 June 82	0105	34 15.2 N	071 14.2 W	Nephe3
7	1	Nephelome	0	08 June 82	1305	33 35.4 N	069 51.4 W	Nephe3
7	2	Fluoromet	0	08 June 82	1415	33 36.0 N	069 54.0 W	Fluor6
7	3	Transmiss	0	08 June 82	1510	33 36.0 N	069 54.0 W	Transm
8	1		12	10 June 82	1720	28 17.0 N	063 01.0 W	Transm
8	2		0	10 June 82	1930	28 18.0 N	063 00.0 W	Fluor6
9	1	Quantum	0	11 June 82	1710	25 56.5 N	060 02.0 W	Fluor7
9	1L	LaRock	12	11 June 82	1840	26 00.0 N	060 00.0 W	Nephe4
9	1A	Chemical	12	12 June 82	0315	25 57.2 N	059 59.2 W	Transm
9	1B		7	12 June 82	0445	26 00.0 N	060 00.0 W	Fluor7
9	1C	Schwarz	2	12 June 82	0640	26 00.0 N	060 00.0 W	Nephe3
9	2A		6	12 June 82	1520	26 00.0 N	060 00.0 W	Transm
9	2B	Chemical	12	12 June 82	1700	25 58.9 N	060 02.4 W	Fluor7
9	2C	TSM	12	12 June 82	2200	26 00.0 N	060 00.0 W	Transm
10	1	Chemical	12	13 June 82	1445	25 59.2 N	062 30.1 W	Transm
10	2	Fluoromet	0	13 June 82	1715	25 56.5 N	062 27.6 W	Fluor7
10	3	TSM	12	13 June 82	2005	25 54.8 N	062 25.0 W	Transm
11	0	CTD Test	0	14 June 82	1300	26 00.0 N	065 00.0 W	Transm
11	1A	Deep Chem	7	14 June 82	1445	26 01.1 N	065 00.9 W	Transm
11	1B	Shal Chem	12	14 June 82	1710	26 00.0 N	065 00.0 W	Fluor7
11	2A	Deep Chem	6	15 June 82	0200	25 59.5 N	064 59.7 W	Fluor7
11	2B	Shal Chem	12	15 June 82	0320	26 00.0 N	065 00.0 W	Nephe3



Table 2. Station and location description (continued)

STATION	CAST	CAST TYPE	ST	DATE	TIME	LATITUDE	LONGITUDE	SENSOR
12	1	Fluoromet	0	15 June 82	2030	26 00.0 N	067 31.0 W	Fluor7
12	2	Chemical	12	15 June 82	2200	26 00.6 N	067 31.3 W	Transm
12	3	TSM	12	16 June 82	0205	26 03.7 N	067 31.6 W	Nephe3
13	1A	Deep Chem	6	17 June 82	0200	26 00.0 N	070 00.0 W	Fluor7
13	1B	Shal Chem	12	17 June 82	0345	26 00.0 N	070 00.0 W	Nephe3
13	1C	Deep Neph	0	17 June 82	0530	26 01.6 N	070 00.7 W	Nephe3
13	2A	Shal Chem	12	17 June 82	0900	25 58.0 N	070 02.0 W	Fluor7
14	1	Chemical	12	18 June 82	1500	26 00.0 N	072 30.0 W	Transm
14	2	Fluoromet	0	18 June 82	1730	26 03.6 N	072 27.9 W	Fluor7
14	3L	Deep Neph	6	18 June 82	1835	26 00.0 N	072 30.0 W	Nephe3
15	1A	Deep Chem	6	19 June 82	1445	26 00.7 N	075 10.4 W	Transm
15	1B	Shal Chem	12	19 June 82	1710	26 00.0 N	075 12.0 W	Transm
15	1C	Schwarz	2	19 June 82	2015	25 59.5 N	075 11.7 W	Fluor7
16	1A	Fluoromet	0	20 June 82	1620	28 22.5 N	074 18.6 W	Fluor7
16	1B	Shal Chem	12	20 June 82	1705	28 20.5 N	074 19.8 W	Transm
16	2A	Wofsy Nig	12	21 June 82	0130	28 24.2 N	074 14.8 W	Nephe3
17	1	Shal Chem	12	21 June 82	1930	30 49.5 N	073 34.7 W	Fluor7
17	2	TSM	12	21 June 82	2215	30 52.0 N	073 35.3 W	Transm
17	3	Nephelome	0	22 June 82	0040	30 53.1 N	073 37.8 W	Nephe3
18	1	Chemical	12	22 June 82	1705	33 12.9 N	072 48.4 W	Fluor7
18	2	Schwarz	3	22 June 82	1830	33 12.3 N	072 47.1 W	Transm
18	3	Trnsmiss	3	22 June 82	2015	33 12.0 N	072 46.4 W	Transm
19	1	Transmiss	0	23 June 82	0500	33 54.6 N	073 13.3 W	Transm
19	2	Chemical	12	23 June 82	0645	33 55.4 N	073 14.0 W	Fluor7
19	3	Nephelome	0	23 June 82	0800	33 54.0 N	073 12.0 W	Nephe3
20	1	Neph Spec	0	23 June 82	2005	34 34.0 N	073 32.0 W	Nephe9
20	2	Chemical	12	23 June 82	1915	34 36.0 N	073 30.0 W	Fluor7
20	3	Transmiss	0	23 June 82	2150	34 34.1 N	073 35.3 W	Transm
20	4	Transmiss	0	23 June 82	2320	34 36.0 N	073 30.0 W	Transm
21	1	Transmiss	0	24 June 82	0610	35 19.0 N	073 52.3 W	Transm
21	2	Neph Spec	0	24 June 82	0805	35 19.0 N	073 52.0 W	Nephe9
21	3	Nephelome	0	24 June 82	0840	35 20.6 N	073 49.8 W	Nephe1
21	4	Chemical	12	24 June 82	1035	35 21.1 N	073 47.7 W	Fluor7
22	1	Chemical	6	24 June 82	2025	35 59.7 N	074 55.1 W	Fluor3
22	2	Transmiss	6	24 June 82	2005	36 00.0 N	074 54.0 W	Transm
22	3	Transmiss	0	24 June 82	2245	35 57.4 N	074 55.4 W	Transm
23	1	Transmiss	0	25 June 82	0945	36 56.6 N	075 59.1 W	Transm

tivity and temperature fine structure seen in the continuous CTD profiles; (3) the CTD data reported for the up-cast sampling were recorded in the turbulent wake of the large, ascending package. On the other hand, the presence of large discrepancies between the two salinity measurements as well as in the nutrient data was used as a basis for reassigning the sampling depth of a bottle in those few cases of a bottle tripping out of sequence (see METHODS section).

4. TSM samples were collected in a separate cast from the chemical data at sampling depths chosen on the basis of the continuous nephelometry trace. Thus, the TSM sample depths did not always correspond to the chemistry sample depths. In the tables, TSM values are reported on the casts that they were taken.

#### 5. Table Legend:

<u>Legend</u>	<u>Unit of Measure</u>	<u>Definition</u>
PRESS	dbars	pressure measured from CTD pressure sensor
DEPTH	M	depth calculated from CTD pressure reading (from Saunders (1981))
TEMP	DEG C	in situ temperature from CTD reading
POT TEMP	DEG C	potential temperature calculated from CTD pressure and temperature readings (Bryden, 1973)
SALINITY	‰	salinity of Niskin sample measured with Autosol
SIGMA THETA	(density - 1) x 10 <sup>3</sup>	potential density using Autosol salinity and potential temperature (Millero et al., 1980)
OXYGEN	mL/L	dissolved oxygen
TSM	μg/L of seawater	Total Suspended Matter (gravimetric)
CHLOROPHYLL	mg/L	total chlorophyll "a" (chl "a")
PHAEOPHYTIN	mg/L	total phaeopigment (i.e., chlorophyll degradation products)
PHOSPHATE	μg-atoms/L = μM	dissolved orthophosphate phosphorus, PO <sub>4</sub>
SILICATE	μg-atoms/L = μM	dissolved silicate silicon, Si
NITRATE	μg-atoms/L = μM	dissolved nitrate nitrogen, NO <sub>3</sub>
NITRITE	μg-atoms/L = μM	dissolved nitrite nitrogen, NO <sub>2</sub>
AMMONIA	μg-atoms/L = μM	dissolved ammonium ion, NH <sub>4</sub> OH
DOC	μg C/L	dissolved organic carbon

POC	µg C/L)	particulate organic carbon
TOTAL ATP	ng/L	ATP of particles from 200- to 0.2-µm diameter
>2 µm ATP	ng/L	ATP of particles 200- to 2-µm diameter
<2 µm ATP	ng/L	ATP of particles 2- to 0.2-µm diameter
METHANE	nL/L	dissolved methane
NITROUS OXIDE	nL/L	dissolved nitrous oxide

## DISCUSSION

### Unusual Occurrences

There were unusual occurrences on several casts during this sampling effort, not unusual for any field mission. On several occasions, two bottles tripped together and on one cast, several salinity bottles were collected out of sequence. The data tables in Appendix A have been corrected for these occurrences. Appendix B contains notes on stations and casts that are missing data, or whose bottles tripped together, and reports other data discrepancies that should be noted in working with this data set.

### Results Not Reported Here

Samples from all stations (except station 18) were collected and filtered for total pigment analysis by High Pressure Liquid Chromatography (HPLC). Filtered samples provided by NORDA were extracted as for chlorophyll (see METHODS section) and HPLC was used to separate total pigments into fractions. These results are the property of Texas A&M University and will be published elsewhere.

### Ancillary Data

On 6 casts (16-1B, 16-2A, 18-1, 20-2, 21-4, 22-1) water samples were collected for analysis of methane, nitrous oxide and methyl chloride by personnel from the Center for Earth and Planetary Physics at Harvard University. These data are available from Dr. Steven C. Wofsy at Harvard.

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APPENDIX A

STATION DATA TABLES

# USNS LYNCH 710-82 N. ATLANTIC

STATION 1 CAST 1 5 JUNE 1982 1137 GMT

POSITION 36 42.5 N 74 46.2 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	32.9	32.6	7.470	7.467	33.220	25.952	8.00	-
2	23.2	23.0	7.950	7.948	33.042	25.744	8.15	-
3	35.0	34.7	7.640	7.637	33.308	25.997	6.90	-
4	44.0	43.7	7.840	7.836	33.388	26.032	6.63	-
5	48.2	47.8	7.870	7.865	33.401	26.037	6.68	-
6	60.6	60.1	7.740	7.734	33.409	26.062	6.40	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
32.6	0.14	2.17	0.06	0.16	0.78	0.324	0.113
23.0	0.18	2.60	0.06	0.14	0.78	0.444	0.321
34.7	0.27	3.22	0.08	0.21	0.78	2.620	0.591
43.7	0.37	3.84	1.40	0.45	1.50	0.478	0.178
47.8	0.35	3.91	1.54	0.43	1.36	0.273	0.230
60.1	0.45	4.09	2.10	0.45	1.76	0.175	0.189

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
32.6	-	-	-	-	-	752.5	367
23.0	-	-	-	-	-	303.7	336
34.7	-	-	-	-	-	686.0	257
43.7	-	-	-	-	-	2026.5	279
47.8	-	-	-	-	-	4375.0	204
60.1	-	-	-	-	-	1527.5	263

# USNS LYNCH 710-82 N. ATLANTIC

STATION 2 CAST 1 5 JUNE 1982 1740 GMT

POSITION 36 28.0 N 74 03.0 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	4.0	4.0	20.050	20.049	33.521	23.622	5.32	-
2	19.8	19.6	17.860	17.857	35.374	25.594	6.44	178
3	25.8	25.6	16.490	16.486	35.367	25.917	6.35	194
4	34.2	33.9	14.860	14.855	35.335	26.262	6.20	305
5	45.5	45.2	13.580	13.574	35.359	26.553	5.22	75
6	58.5	58.1	13.349	13.341	35.478	26.693	5.23	31
7	102.2	101.4	12.970	12.956	35.539	26.817	3.76	31
8	318.0	315.4	7.910	7.878	35.114	27.377	2.92	-
9	456.8	452.9	5.980	5.940	35.024	27.574	4.71	-
10	600.7	595.3	5.070	5.021	35.001	27.668	5.56	-
11	800.3	792.8	4.530	4.467	34.989	27.720	6.31	-
12	998.7	988.9	4.250	4.172	34.975	27.740	6.71	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
4.0	0.30	1.67	0.12	0.12	0.24	0.153	0.036
19.6	0.22	1.55	0.14	0.14	0.30	0.246	0.104
25.6	0.22	1.61	0.14	0.14	0.24	0.410	0.246
33.9	0.26	2.11	0.35	0.16	0.24	1.672	0.896
45.2	0.49	3.41	6.39	0.16	0.24	0.115	0.130
58.1	0.60	4.22	8.40	0.15	0.36	0.037	0.073
101.4	0.73	5.46	10.00	0.15	0.21	0.009	0.035
315.4	1.57	17.00	23.40	0.14	0.21	0.004	0.028
452.9	1.33	15.50	21.20	0.14	0.24	0.007	0.003
595.3	1.27	14.40	20.30	0.12	0.24	0.004	0.022
792.8	1.23	13.80	19.80	0.12	0.24	0.003	0.019
988.9	1.18	13.60	19.40	0.12	0.24	0.003	0.017

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
4.0	75.4	8.8	-	-	-	-	122
19.6	69.7	10.9	-	-	-	-	147
25.6	76.0	9.2	-	-	-	-	212
33.9	78.4	22.1	-	-	-	-	147
45.2	60.2	4.2	-	-	-	-	221
58.1	63.4	2.4	-	-	-	-	303
101.4	43.4	3.3	-	-	-	-	168
315.4	43.1	1.9	-	-	-	122.0	409
452.9	51.1	1.4	-	-	-	-	233
595.3	78.6	2.2	-	-	-	-	254
792.8	56.2	1.3	-	-	-	-	259
988.9	57.6	1.7	-	-	-	-	250

# USNS LYNCH 710-82 N. ATLANTIC

STATION 3                      CAST 2                      6 JUNE 1982                      0330 GMT

POSITION 36 06.4 N 73 22.0 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	6.5	6.5	26.770	26.769	35.942	23.503	4.81	-
2	33.0	32.7	26.640	26.632	36.235	23.765	4.93	-
3	45.3	45.0	24.537	24.527	36.144	24.349	5.09	-
4	82.0	81.4	21.940	21.924	36.591	25.446	4.26	-
5	121.0	120.1	19.180	19.158	36.514	26.134	3.71	-
6	175.0	173.6	16.060	16.032	36.158	26.626	4.14	-
7	195.0	193.4	12.720	12.694	35.303	26.684	4.70	-
8	176.2	174.8	12.298	12.275	35.246	26.723	5.57	-
9	205.2	203.6	13.416	13.387	35.616	26.786	4.96	-
10	499.0	494.7	7.160	7.112	35.070	27.452	4.29	-
11	778.0	770.7	4.840	4.777	34.998	27.692	5.67	-
12	961.0	951.6	4.430	4.354	34.979	27.723	5.95	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
6.5	0.62	2.20	0.06	0.11	0.57	0.598	0.227
32.7	0.42	2.33	0.12	0.12	0.46	0.093	0.054
45.0	0.48	2.02	0.17	0.13	0.46	0.256	0.247
81.4	0.56	2.84	2.96	0.20	0.43	0.082	0.226
120.1	0.68	4.16	6.30	0.13	0.48	0.029	0.069
173.6	0.84	4.91	7.80	0.13	0.51	0.039	0.011
193.4	0.76	5.80	7.95	0.16	0.46	0.057	0.074
174.8	0.80	4.54	7.20	0.13	0.46	0.017	0.039
203.6	0.84	5.48	10.40	0.14	0.46	0.005	0.028
494.7	1.56	16.80	23.10	0.13	0.48	0.004	0.018
770.7	1.28	14.40	18.70	0.12	0.46	0.003	0.023
951.6	1.24	13.90	18.20	0.12	0.46	0.003	0.019

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
6.5	-	-	-	-	-	-	133
32.7	-	-	-	-	-	-	129
45.0	-	-	-	-	-	74.9	130
81.4	-	-	-	-	-	131.0	294
120.1	-	-	-	-	-	19.7	264
173.6	-	-	-	-	-	183.0	-
193.4	-	-	-	-	-	904.5	179
174.8	-	-	-	-	-	128.0	138
203.6	-	-	-	-	-	-	195
494.7	-	-	-	-	-	-	244
770.7	-	-	-	-	-	-	210
951.6	-	-	-	-	-	-	264



# USNS LYNCH 710-82 N. ATLANTIC

STATION 4 CAST 2 6 JUNE 1982 1800 GMT

POSITION 35 31.1 N 72 56.2 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	56.5	56.1	20.680	20.669	36.636	25.829	5.13	-
2	104.3	103.5	19.390	19.371	36.613	26.155	4.70	-
3	193.5	192.0	18.430	18.396	36.552	26.355	4.73	-
4	482.7	478.5	16.880	16.799	36.337	26.571	4.52	-
5	705.5	699.0	13.340	13.239	35.745	26.902	3.91	-
6	872.5	864.2	9.330	9.229	35.201	27.222	3.16	-
7	911.4	902.6	8.830	8.728	35.200	27.302	3.63	-
8	988.0	978.3	7.260	7.160	35.059	27.429	4.63	-
9	1105.0	1093.9	5.129	5.034	35.012	27.670	5.36	-
10	1189.0	1176.8	4.860	4.760	35.012	27.701	5.61	-
11	1277.5	1264.2	4.740	4.632	35.032	27.731	5.73	-
12	1417.5	1402.3	4.330	4.214	34.997	27.749	5.96	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
56.1	0.27	1.24	0.09	0.14	0.22	-	-
103.5	0.27	1.92	1.76	0.19	0.12	-	-
192.0	0.27	1.92	2.42	0.14	0.11	-	-
478.5	0.48	3.22	5.90	0.14	0.11	-	-
699.0	0.93	7.75	12.80	0.14	0.11	-	-
864.2	1.00	17.70	21.00	0.14	0.12	-	-
902.6	1.41	15.80	18.90	0.13	0.11	-	-
978.3	1.41	16.60	18.50	0.13	0.10	-	-
1093.9	1.25	14.40	16.70	0.13	0.11	-	-
1176.8	1.18	14.30	16.50	0.12	0.11	-	-
1264.2	1.10	14.40	16.30	0.12	0.11	-	-
1402.3	1.06	14.00	16.10	0.12	0.11	-	-

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
56.1	-	-	-	-	-	-	-
103.5	-	-	-	-	-	-	-
192.0	-	-	-	-	-	-	-
478.5	-	-	-	-	-	-	-
699.0	63.9	2.7	-	-	-	-	-
864.2	-	-	-	-	-	-	-
902.6	-	-	-	-	-	-	-
978.3	54.6	1.1	-	-	-	-	-
1093.9	59.2	1.3	-	-	-	-	-
1176.8	53.3	1.4	-	-	-	-	-
1264.2	44.2	0.9	-	-	-	-	-
1402.3	59.0	0.1	-	-	-	-	-

# USNS LYNCH 710-82 N. ATLANTIC

STATION 4

CAST 3

6 JUNE 1982

2030 GMT

POSITION 35 31.0 N 72 54.0 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	16.0	15.9	25.050	25.046	36.296	24.308	5.01	-
2	36.0	35.7	21.540	21.533	36.611	25.573	5.22	71
3	49.0	48.6	20.950	20.941	36.642	25.760	4.84	-
4	82.0	81.4	19.739	19.724	36.612	26.062	4.83	43
5	102.0	101.2	19.420	19.401	36.617	26.150	4.61	55
8	196.0	194.4	18.460	18.425	36.555	26.349	4.72	64
9	401.6	398.2	17.599	17.530	36.477	26.504	4.80	41
10	853.6	845.5	10.119	10.016	35.321	27.183	3.49	25
11	1039.0	1028.7	5.800	5.706	35.078	27.640	4.07	37
12	1279.8	1266.4	4.775	4.667	35.033	27.728	5.72	15

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
15.9	0.27	1.61	0.04	0.10	0.12	0.039	0.020
35.7	0.23	1.24	0.09	0.10	0.13	0.068	0.036
48.6	0.23	1.24	0.13	0.13	0.14	0.324	0.266
81.4	0.23	1.55	1.01	0.22	0.14	0.222	0.215
101.2	0.30	1.86	2.51	0.14	0.19	0.044	0.051
194.4	0.32	2.17	3.30	0.14	0.49	0.010	0.014
398.2	0.38	2.48	4.97	0.12	0.49	0.004	0.006
845.5	1.48	14.30	23.50	0.12	0.49	0.002	0.005
1028.7	1.71	18.30	24.90	0.12	0.22	0.001	0.008
1266.4	1.39	14.40	20.00	0.12	0.14	0.001	0.004

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
15.9	-	-	-	-	-	-	122
35.7	73.5	3.7	-	-	-	-	131
48.6	74.4	7.2	-	-	-	-	137
81.4	64.2	2.8	-	-	-	-	213
101.2	66.9	2.6	-	-	-	-	244
194.4	71.2	1.0	-	-	-	-	160
398.2	60.0	1.0	-	-	-	-	117
845.5	54.1	1.1	-	-	-	11.5	313
1028.7	49.7	1.2	-	-	-	-	208
1266.4	67.1	0.9	-	-	-	-	246

## USNS LYNCH 710-82 N. ATLANTIC

STATION 5 CAST 3 7 JUNE 1982 1100 GMT

POSITION 35 00.0 N 72 31.2 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	9.0	8.9	22.929	22.927	36.347	24.978	4.99	-
2	24.5	24.3	21.650	21.645	36.540	25.488	5.22	-
3	43.0	42.7	19.720	19.712	36.586	26.048	5.46	-
4	68.0	67.5	19.054	19.042	36.577	26.214	5.40	-
5	94.0	93.3	18.900	18.883	36.571	26.249	5.34	-
6	106.0	105.2	18.850	18.831	36.570	26.261	5.19	-
7	122.0	121.0	18.750	18.728	36.559	26.279	5.19	-
8	149.0	147.8	18.678	18.651	36.551	26.291	5.09	-
9	193.0	191.5	18.660	18.626	36.547	26.292	5.11	-
10	300.0	297.5	18.461	18.408	36.555	26.349	5.08	-
11	502.0	497.6	17.890	17.803	36.506	26.455	4.79	-
12	995.0	985.2	9.160	9.046	35.203	27.252	3.49	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
8.9	0.25	1.38	0.05	0.13	0.42	0.104	0.071
24.3	0.25	1.32	0.05	0.13	0.42	0.014	0.089
42.7	0.25	1.32	0.05	0.13	0.39	0.186	0.122
67.5	0.25	1.38	0.05	0.13	0.11	0.131	0.072
93.3	0.25	1.38	0.05	0.15	0.11	0.256	0.181
105.2	0.25	1.59	0.51	0.36	0.11	0.213	0.165
121.0	0.25	1.86	1.00	0.15	0.12	0.046	0.047
147.8	0.25	1.86	1.19	0.14	0.01	0.020	0.025
191.5	0.25	1.86	1.16	0.13	0.11	0.004	0.010
297.5	0.29	1.86	1.51	0.13	0.11	0.001	0.005
497.6	0.44	2.12	5.13	0.12	0.17	0.002	0.009
985.2	1.72	16.00	25.10	0.11	0.20	0.001	0.003

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
8.9	72.4	4.9	-	-	-	-	96
24.3	-	3.2	-	-	-	12.2	104
42.7	73.0	4.0	-	-	-	50.9	169
67.5	65.3	4.0	-	-	-	-	109
93.3	68.1	3.1	-	-	-	47.3	223
105.2	62.4	2.5	-	-	-	-	92
121.0	57.7	2.3	-	-	-	-	110
147.8	65.8	1.0	-	-	-	-	110
191.5	61.9	1.8	-	-	-	-	106
297.5	64.0	1.2	-	-	-	-	85
497.6	67.6	1.4	-	-	-	-	100
985.2	46.1	1.1	-	-	-	-	243

# USNS LYNCH 710-82 N. ATLANTIC

STATION 6 CAST 4 8 JUNE 1982 0105 GMT

POSITION 34 15.0 N 71 14.0 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	15.0	14.9	22.920	22.917	36.424	25.039	5.00	-
2	33.0	32.7	21.850	21.843	36.503	25.404	5.17	-
3	43.0	42.7	20.960	20.952	36.526	25.669	5.26	-
4	55.0	54.6	20.410	20.400	36.525	25.817	5.14	-
5	67.0	66.5	20.160	20.147	36.542	25.897	5.17	-
6	72.6	72.0	20.070	20.056	36.534	25.915	5.12	-
7	85.0	84.3	19.761	19.745	36.535	25.998	5.08	-
8	102.0	101.2	19.638	19.619	36.550	26.042	5.10	-
9	147.0	145.8	19.281	19.254	36.553	26.137	4.94	-
10	206.0	204.3	18.861	18.824	36.563	26.253	4.93	-
11	494.6	490.3	17.780	17.694	36.491	26.470	4.85	-
12	998.0	988.2	9.810	9.691	35.262	27.190	3.28	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
14.9	0.26	1.11	0.02	0.09	0.22	0.037	0.013
32.7	0.24	1.11	0.05	0.12	0.22	0.047	0.018
42.7	0.22	1.11	0.05	0.12	0.22	0.056	0.031
54.6	0.18	1.11	0.05	0.12	0.22	0.137	0.101
66.5	0.17	1.17	0.05	0.12	0.24	0.170	0.159
72.0	0.17	1.43	0.17	0.21	0.24	0.307	0.261
84.3	0.15	1.48	0.48	0.26	0.24	0.158	0.128
101.2	0.20	1.54	0.48	0.31	0.22	0.077	0.070
145.8	0.18	1.75	1.39	0.13	0.24	0.013	0.012
204.3	0.18	1.96	1.63	0.13	0.22	0.002	0.012
490.3	0.24	2.65	4.13	0.11	0.22	0.002	0.006
988.2	1.49	16.20	24.80	0.10	0.24	0.001	0.006

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
14.9	91.7	3.7	-	-	-	-	95
32.7	80.9	4.1	-	-	-	-	343
42.7	78.0	4.3	-	-	-	-	84
54.6	75.1	3.6	-	-	-	-	133
66.5	68.6	3.3	-	-	-	-	91
72.0	83.5	3.0	-	-	-	-	79
84.3	73.1	2.2	-	-	-	46.2	87
101.2	75.8	1.5	-	-	-	47.9	94
145.8	72.1	1.4	-	-	-	42.7	88
204.3	75.9	1.7	-	-	-	44.7	154
490.3	61.1	1.5	-	-	-	42.0	253
988.2	44.6	0.9	-	-	-	25.2	612

# USNS LYNCH 710-82 N. ATLANTIC

STATION 8 CAST 1 10 JUNE 1982 1720 GMT

POSITION 28 17.0 N 63 01.0 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	14.0	13.9	23.250	23.247	36.645	25.111	4.96	-
2	27.0	26.8	21.900	21.895	36.733	25.565	5.12	-
3	50.2	49.8	21.130	21.120	36.652	25.718	5.23	-
4	73.0	72.4	20.570	20.556	36.618	25.845	5.26	-
5	89.6	88.9	20.480	20.463	36.809	26.015	4.51	-
6	196.5	194.9	18.160	18.126	36.523	26.400	4.75	-
7	386.4	383.1	17.330	17.264	36.429	26.533	4.92	-
8	610.7	605.2	14.439	14.347	35.919	26.804	4.27	-
9	849.4	841.3	8.460	8.368	35.135	27.310	4.02	-
10	1205.9	1193.5	5.496	5.388	35.108	27.702	5.21	-
11	1485.3	1469.1	4.630	4.504	35.072	27.775	5.68	-
12	1994.0	1970.0	3.656	3.494	35.001	27.823	5.76	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
13.9	0.24	1.58	0.02	0.10	0.25	-	-
26.8	0.22	1.47	0.02	0.12	0.25	-	-
49.8	0.22	1.40	0.02	0.14	0.27	-	-
72.4	0.19	1.47	0.02	0.13	0.26	-	-
88.9	0.19	1.50	0.72	0.12	0.26	-	-
194.9	0.30	2.10	3.85	0.14	0.25	-	-
383.1	0.38	2.45	5.00	0.14	0.28	-	-
605.2	0.80	5.60	12.20	0.11	0.27	-	-
841.3	1.57	16.10	21.00	0.10	0.26	-	-
1193.5	1.42	15.20	19.20	0.10	0.27	-	-
1469.1	1.36	15.80	18.50	0.13	0.26	-	-
1970.0	1.38	21.00	18.50	0.13	0.26	-	-

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
13.9	-	-	-	-	-	46.0	569
26.8	-	-	-	-	-	49.1	-
49.8	-	-	-	-	-	48.9	116
72.4	-	-	-	-	-	50.1	127
88.9	-	-	-	-	-	51.8	461
194.9	-	-	-	-	-	42.6	147
383.1	-	-	-	-	-	50.5	191
605.2	-	-	-	-	-	42.6	233
841.3	-	-	-	-	-	21.6	393
1193.5	-	-	-	-	-	17.0	315
1469.1	-	-	-	-	-	16.8	434
1970.0	-	-	-	-	-	12.7	553

# USNS LYNCH 710-82 N. ATLANTIC

STATION 9 CAST 1L 11 JUNE 1982 1840 GMT

POSITION 26 00.0 N 60 00.0 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	23.5	23.3	23.050	23.045	36.737	25.239	5.08	-
2	122.5	121.5	19.570	19.547	36.607	26.103	4.98	-
3	160.0	158.7	18.810	18.781	36.533	26.243	5.06	-
4	209.5	207.8	18.190	18.153	36.507	26.380	4.82	-
5	248.5	246.5	17.941	17.898	36.495	26.433	4.88	-
6	298.6	296.1	17.732	17.681	36.477	26.471	4.81	-
7	400.5	397.1	17.140	17.072	36.389	26.548	4.75	-
8	506.2	501.8	15.680	15.600	36.111	26.677	4.22	-
9	591.7	586.4	13.550	13.465	35.775	26.881	4.02	-
10	732.5	725.7	10.880	10.788	35.421	27.126	3.59	-
11	947.4	938.2	7.090	6.996	35.062	27.455	3.97	-
12	1229.6	1216.9	5.585	5.474	35.076	27.665	4.82	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
23.3	0.28	1.47	0.03	0.11	0.17	-	-
121.5	0.25	1.47	0.06	0.11	0.18	-	-
158.7	0.28	1.64	0.49	0.23	0.20	-	-
207.8	0.35	1.92	3.10	0.15	0.19	-	-
246.5	0.36	2.17	3.83	0.14	0.19	-	-
296.1	0.36	2.17	3.83	0.15	0.20	-	-
397.1	0.45	2.80	5.89	0.15	0.17	-	-
501.8	0.73	4.72	10.70	0.15	0.17	-	-
586.4	0.94	7.18	14.60	0.15	0.18	-	-
725.7	1.32	12.10	19.80	0.15	0.18	-	-
938.2	1.62	19.40	22.60	0.15	0.19	-	-
1216.9	1.43	17.50	20.60	0.15	0.19	-	-

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
23.3	85.8	3.3	-	-	-	-	-
121.5	-	-	-	-	-	-	-
158.7	60.2	1.9	-	-	-	-	-
207.8	-	-	-	-	-	-	-
246.5	54.7	1.8	-	-	-	-	-
296.1	-	-	-	-	-	-	-
397.1	-	-	-	-	-	-	-
501.8	52.1	0.8	-	-	-	-	-
586.4	-	-	-	-	-	-	-
725.7	47.8	1.1	-	-	-	-	-
938.2	42.7	0.7	-	-	-	-	-
1216.9	-	-	-	-	-	-	-

# USNS LYNCH 710-82 N. ATLANTIC

STATION 9 CAST 1A 12 JUNE 1982 0315 GMT

POSITION 25 57.2 N 59 59.2 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	19.0	18.9	24.930	24.926	36.515	24.510	4.84	-
2	24.4	24.2	22.790	22.785	36.682	25.272	5.05	-
3	27.0	26.8	22.811	22.805	36.722	25.297	5.17	-
4	33.0	32.7	22.260	22.253	36.706	25.443	5.26	-
5	39.0	38.7	21.600	21.592	36.705	25.628	5.31	-
6	53.2	52.8	21.180	21.170	36.694	25.736	5.33	-
7	98.0	97.2	20.270	20.252	36.655	25.954	5.33	-
8	125.0	124.0	19.390	19.367	36.605	26.149	5.01	-
9	153.0	151.8	18.910	18.883	36.554	26.234	5.17	-
10	164.3	163.0	18.590	18.561	36.526	26.294	4.97	-
11	200.5	198.9	18.197	18.162	36.512	26.383	4.92	-
12	200.8	199.2	18.167	18.132	36.512	26.390	-	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
18.9	0.05	1.70	0.00	0.15	0.16	0.014	0.009
24.2	0.05	1.36	0.00	0.14	0.14	0.005	0.012
26.8	0.05	1.36	0.00	0.15	0.13	0.025	0.014
32.7	0.05	1.36	0.00	0.14	0.14	0.034	0.014
38.7	0.04	1.36	0.00	0.15	0.12	0.054	0.026
52.8	0.04	1.36	0.00	0.15	0.12	-	-
97.2	0.06	1.33	0.05	0.14	0.13	0.115	0.137
124.0	0.06	1.36	0.11	0.15	0.15	0.077	0.119
151.8	0.06	1.36	0.27	0.20	0.14	0.030	0.097
163.0	0.06	1.67	1.94	0.18	0.13	0.017	0.050
198.9	0.10	1.80	2.92	0.14	0.23	0.025	0.014
199.2	0.08	1.80	2.94	0.13	0.14	-	-

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
18.9	123.9	1.6	22.20	19.35	2.85	41.6	139
24.2	88.1	2.4	17.90	14.00	3.89	33.4	458
26.8	89.7	2.5	17.26	16.08	1.19	41.4	313
32.7	85.0	2.4	5.29	4.29	1.00	40.1	140
38.7	81.4	3.0	14.60	11.96	2.64	41.4	156
52.8	78.7	2.2	15.06	10.95	4.11	39.9	370
97.2	-	-	20.57	18.87	1.69	38.3	310
124.0	-	-	10.29	7.87	2.42	38.8	315
151.8	75.6	1.6	21.35	19.62	1.73	38.1	152
163.0	-	-	4.44	3.36	1.08	34.8	126
198.9	-	-	10.38	9.39	0.99	-	395
199.2	63.4	0.8	-	-	-	36.8	107

## USNS LYNCH 710-82 N. ATLANTIC

STATION 9 CAST 1B 12 JUNE 1982 0445 GMT

POSITION 26 00.0 N 60 00.0 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THERMA	OXYGEN mL/L	TSM ug/L
0	8.1	8.0	25.020	25.018	36.357	24.363	4.72	-
13	252.7	250.6	17.960	17.916	36.499	26.432	4.84	-
14	301.0	298.5	17.800	17.748	36.485	26.461	4.73	-
15	356.0	353.0	17.470	17.409	36.445	26.511	4.82	-
16	395.0	391.7	17.200	17.133	36.401	26.543	4.78	-
17	446.0	442.2	16.450	16.377	36.261	26.614	4.42	-
18	498.0	493.7	15.500	15.422	36.106	26.714	4.22	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
8.0	0.11	1.77	0.00	0.13	0.13	-	-
250.6	0.26	2.04	3.43	0.14	0.14	-	-
298.5	0.26	2.21	4.05	0.13	0.14	-	-
353.0	0.29	2.38	4.59	0.14	0.13	-	-
391.7	0.29	2.72	5.10	0.14	0.14	-	-
442.2	0.45	3.74	8.24	0.14	0.14	-	-
493.7	0.58	4.42	9.75	0.14	0.15	-	-

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
8.0	-	-	-	-	-	31.7	86
250.6	-	-	4.11	3.34	0.77	33.4	269
298.5	62.6	0.4	2.43	1.94	0.49	29.4	412
353.0	-	-	1.79	0.85	0.94	38.5	295
391.7	62.2	5.2	0.84	0.54	0.30	35.9	124
442.2	-	-	1.57	1.22	0.35	33.0	320
493.7	69.1	0.8	0.53	2.16	1.37	31.1	307



# USNS LYNCH 710-82 N. ATLANTIC

STATION 9 CAST 1C 12 JUNE 1982 0640 GMT

POSITION 26 00.0 N 60 00.0 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	28.0	27.8	22.506	22.500	36.724	25.386	4.95	-
7	117.0	116.1	19.800	19.778	36.627	26.058	5.05	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
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27.8	-	-	-	-	-	-	-
116.1	0.10	1.39	0.00	0.17	0.32	-	-

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
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27.8	-	-	-	-	-	-	-
116.1	-	-	-	-	-	-	-

# USNS LYNCH 710-82 N. ATLANTIC

STATION 9 CAST 2A 12 JUNE 1982 1520 GMT

POSITION 26 00.0 N 60 00.0 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
13	240.0	238.1	18.010	17.968	36.500	26.420	4.79	-
14	283.0	280.7	17.791	17.742	36.484	26.462	4.76	-
15	341.1	338.3	17.549	17.491	36.457	26.501	4.81	-
16	385.0	381.8	17.320	17.255	36.418	26.527	4.88	-
17	446.0	442.2	16.701	16.627	36.310	26.593	4.56	-
18	497.2	492.9	15.771	15.692	36.143	26.681	4.40	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
238.1	0.13	2.04	3.60	0.15	0.18	0.001	0.006
280.7	0.13	2.21	4.50	0.14	0.15	-	-
338.3	0.11	2.21	4.65	0.13	0.15	-	-
381.8	0.13	2.34	4.80	0.14	0.14	-	-
442.2	0.14	3.06	7.20	0.14	0.15	-	-
492.9	0.19	3.91	9.30	0.14	0.16	-	-

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
238.1	-	-	2.75	1.40	1.35	35.4	176
280.7	67.8	1.4	4.32	3.13	1.19	35.4	244
338.3	-	-	3.29	1.77	1.52	36.4	188
381.8	53.9	1.1	2.83	1.72	1.11	35.2	162
442.2	-	-	1.46	1.12	0.34	35.9	208
492.9	56.1	0.9	1.65	0.88	0.77	35.2	219

# USNS LYNCH 710-82 N. ATLANTIC

STATION 9                      CAST 2B                      12 JUNE 1982                      1700 GMT

POSITION 25 58.9 N 60 02.4 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	10.0	9.9	24.990	24.988	36.578	24.539	4.78	-
2	26.0	25.8	24.950	24.944	36.617	24.581	4.83	-
3	33.0	32.7	22.610	22.603	36.740	25.368	5.12	-
4	42.0	41.7	22.170	22.162	36.733	25.489	5.14	-
5	51.9	51.5	21.530	21.520	36.701	25.644	5.1	-
6	70.0	69.5	21.082	21.068	36.714	25.778	5.14	-
7	73.9	73.3	20.460	20.446	36.700	25.937	5.02	-
8	84.0	83.3	20.690	20.674	36.688	25.866	5.00	-
9	105.0	104.2	20.260	20.240	36.682	25.977	5.20	-
10	132.0	131.0	19.531	19.507	36.596	26.105	5.05	-
11	158.0	156.7	18.790	18.762	36.541	26.255	5.04	-
12	197.0	195.4	18.280	18.245	36.514	26.363	4.86	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
9.9	0.10	1.70	0.00	0.12	0.30	0.014	0.005
25.8	0.10	1.70	0.00	0.12	0.27	0.013	0.005
32.7	0.08	1.36	0.00	0.12	0.16	0.011	0.005
41.7	0.08	1.36	0.00	0.12	0.30	0.015	0.006
51.5	0.11	1.36	0.00	0.12	0.42	0.016	0.009
69.5	0.11	1.36	0.00	0.13	0.24	0.029	0.019
73.3	0.08	1.36	0.00	0.14	0.18	0.042	0.038
83.3	0.08	1.36	0.00	0.15	0.17	0.077	0.070
104.2	0.08	1.19	0.00	0.15	0.18	0.131	0.093
131.0	0.11	1.36	0.00	0.16	0.33	0.126	0.196
156.7	0.11	1.43	0.30	0.29	0.27	0.066	0.158
195.4	0.16	1.70	2.40	0.16	0.60	0.011	0.024

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
9.9	90.0	2.4	19.88	16.84	3.04	67.6	221
25.8	60.2	2.2	11.77	7.39	4.39	42.0	138
32.7	87.5	2.1	14.93	10.29	4.64	42.6	480
41.7	95.8	2.3	26.75	19.21	7.53	35.9	288
51.5	70.1	1.7	17.83	10.66	7.17	35.6	275
69.5	92.8	2.8	16.96	10.38	6.59	36.6	227
73.3	-	-	15.88	9.44	6.44	37.5	-
83.3	91.5	1.8	11.25	6.56	4.69	35.7	203
104.2	-	-	9.34	5.66	3.67	41.5	371
131.0	100.7	1.7	13.72	9.11	4.61	36.8	185
156.7	83.7	1.3	6.69	4.50	2.19	36.6	125
195.4	-	-	99.00	13.10	99.00	33.3	178

# USNS LYNCH 710-82 N. ATLANTIC

STATION 9 CAST 2C 12 JUNE 1982 2200 GMT

POSITION 26 00.0 N 60 00.0 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	500.7	496.3	15.694	15.614	36.144	26.699	-	10
2	500.7	496.3	15.694	15.614	36.141	26.697	-	12
3	249.9	247.9	17.965	17.922	36.503	26.434	-	40
4	249.9	247.9	17.965	17.922	36.503	26.434	-	19
5	184.6	183.1	18.541	18.508	36.527	26.307	-	16
6	161.1	159.8	18.988	18.959	36.564	26.221	-	19
7	141.5	140.4	19.405	19.379	36.603	26.143	-	52
8	125.4	124.4	19.808	19.785	36.642	26.067	-	25
9	111.9	111.0	20.173	20.152	36.683	26.001	-	19
10	81.6	81.0	20.538	20.522	36.681	25.902	-	30
11	52.6	52.2	21.329	21.319	36.697	25.697	-	42
12	14.1	14.0	24.676	24.673	36.531	24.599	-	45

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
496.3	-	-	-	-	-	-	-
496.3	-	-	-	-	-	-	-
247.9	-	-	-	-	-	-	-
247.9	-	-	-	-	-	-	-
183.1	-	-	-	-	-	-	-
159.8	-	-	-	-	-	-	-
140.4	-	-	-	-	-	-	-
124.4	-	-	-	-	-	-	-
111.0	-	-	-	-	-	-	-
81.0	-	-	-	-	-	-	-
52.2	-	-	-	-	-	-	-
14.0	-	-	-	-	-	-	-

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
496.3	-	-	-	-	-	-	-
496.3	-	-	-	-	-	-	-
247.9	-	-	-	-	-	-	-
247.9	-	-	-	-	-	-	-
183.1	-	-	-	-	-	-	-
159.8	-	-	-	-	-	-	-
140.4	-	-	-	-	-	-	-
124.4	-	-	-	-	-	-	-
111.0	-	-	-	-	-	-	-
81.0	-	-	-	-	-	-	-
52.2	-	-	-	-	-	-	-
14.0	-	-	-	-	-	-	-

# USNS LYNCH 710-82 N. ATLANTIC

STATION 10 CAST 1 13 JUNE 1982 1445 GMT

POSITION 25 59.2 N 62 30.1 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	15.8	15.7	25.016	25.013	36.467	24.447	4.86	-
2	27.8	27.6	24.660	24.654	36.601	24.657	4.90	-
3	41.0	40.7	22.110	22.102	36.687	25.471	5.20	-
4	73.0	72.4	21.331	21.317	36.620	25.638	5.28	-
5	80.0	79.4	20.840	20.825	36.574	25.738	5.36	-
6	95.0	94.3	20.410	20.392	36.568	25.850	5.38	-
7	123.0	122.0	19.504	19.481	36.574	26.095	5.19	-
8	141.0	139.9	19.020	18.995	36.547	26.200	4.95	-
9	174.7	173.3	18.880	18.849	36.582	26.263	4.75	-
10	192.0	190.5	18.760	18.726	36.576	26.289	4.54	-
11	349.2	346.3	17.590	17.530	36.466	26.498	4.79	-
12	501.0	496.6	15.630	15.551	36.115	26.691	4.30	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
15.7	0.08	1.86	0.00	0.12	0.20	0.011	0.010
27.6	0.08	1.86	0.00	0.14	0.16	0.012	0.011
40.7	0.06	1.47	0.00	0.14	0.15	0.018	0.009
72.4	0.08	1.30	0.00	0.14	0.16	0.047	0.026
79.4	0.10	1.22	0.00	0.13	0.17	0.063	0.054
94.3	0.11	1.33	0.00	0.12	0.32	0.088	0.074
122.0	0.10	1.64	0.00	0.13	0.16	0.109	0.108
139.9	0.13	1.75	1.02	0.28	0.16	0.066	0.158
173.3	0.16	1.75	2.03	0.14	0.14	0.012	0.047
190.5	0.22	2.10	3.39	0.13	0.14	0.004	0.011
346.3	0.34	2.62	4.78	0.13	0.14	0.001	0.003
496.6	0.64	4.72	10.20	0.12	0.13	0.001	0.003

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
15.7	82.6	1.8	11.86	7.96	3.90	76.0	124
27.6	70.2	1.6	14.00	9.92	4.08	36.2	178
40.7	81.0	2.3	10.42	6.94	3.48	43.4	300
72.4	78.1	2.5	17.83	10.84	6.99	40.3	462
79.4	72.9	2.5	18.07	10.23	7.84	42.5	532
94.3	92.5	3.4	36.89	33.43	3.47	43.0	269
122.0	68.7	2.5	20.97	15.09	5.87	41.8	293
139.9	74.1	1.2	13.89	10.90	2.98	51.9	355
173.3	66.1	1.3	6.50	4.18	2.32	42.5	184
190.5	67.2	1.0	3.62	2.03	1.58	43.7	188
346.3	79.4	0.8	3.22	1.34	1.88	39.8	191
496.6	61.2	0.8	6.21	2.68	3.52	36.4	234

# USNS LYNCH 710-82 N. ATLANTIC

STATION 10 CAST 3 13 JUNE 1982 2005 GMT

POSITION 25 54.8 N 62 25.0 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	10.3	10.2	25.202	25.200	36.468	24.391	-	35
2	35.0	34.7	24.403	24.395	36.697	24.808	-	32
3	48.8	48.4	22.784	22.774	36.713	25.298	-	35
4	68.8	68.3	21.814	21.800	36.651	25.527	-	38
5	87.5	86.8	21.270	21.253	36.611	25.648	-	46
6	105.2	104.4	20.632	20.612	36.567	25.789	-	41
7	113.9	113.0	20.347	20.325	36.561	25.862	-	42
8	136.7	135.6	19.677	19.652	36.580	26.054	-	37
9	156.2	155.0	19.300	19.272	36.551	26.131	-	19
10	180.7	179.3	19.034	19.001	36.605	26.241	-	10
11	202.8	201.2	18.526	18.490	36.550	26.329	-	11
12	398.5	395.1	17.015	16.948	36.358	26.554	-	10

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
10.2	-	-	-	-	-	-	-
34.7	-	-	-	-	-	-	-
48.4	-	-	-	-	-	-	-
68.3	-	-	-	-	-	-	-
86.8	-	-	-	-	-	-	-
104.4	-	-	-	-	-	-	-
113.0	-	-	-	-	-	-	-
135.6	-	-	-	-	-	-	-
155.0	-	-	-	-	-	-	-
179.3	-	-	-	-	-	-	-
201.2	-	-	-	-	-	-	-
395.1	-	-	-	-	-	-	-

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
10.2	-	-	-	-	-	-	-
34.7	-	-	-	-	-	-	-
48.4	-	-	-	-	-	-	-
68.3	-	-	-	-	-	-	-
86.8	-	-	-	-	-	-	-
104.4	-	-	-	-	-	-	-
113.0	-	-	-	-	-	-	-
135.6	-	-	-	-	-	-	-
155.0	-	-	-	-	-	-	-
179.3	-	-	-	-	-	-	-
201.2	-	-	-	-	-	-	-
395.1	-	-	-	-	-	-	-

USNS LYNCH 710-82 N. ATLANTIC

STATION 11 CAST 1A 14 JUNE 1982 1445 GMT

POSITION 26 01.1 N 65 00.9 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	32.0	31.8	24.910	24.903	36.583	24.567	-	-
13	206.0	204.3	19.140	19.103	36.645	26.244	4.41	-
14	249.2	247.2	18.236	--	--	--	-	-
15	297.0	294.6	17.990	17.938	36.516	26.437	4.71	-
16	338.0	335.2	17.780	17.722	36.490	26.469	4.77	-
17	403.0	399.6	17.280	17.212	36.402	26.524	4.58	-
18	495.0	490.7	15.980	15.900	36.164	26.649	4.15	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
31.8	-	-	-	-	-	-	-
204.3	0.06	1.75	2.58	0.14	0.15	-	-
247.2	-	-	-	-	-	-	-
294.6	0.09	2.10	4.02	0.13	0.15	-	-
335.2	0.09	2.24	4.38	0.12	0.16	-	-
399.6	0.11	2.73	6.00	0.12	0.15	-	-
490.7	0.31	4.20	10.10	0.12	0.15	-	-

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	2-20u ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
31.8	-	-	-	-	-	-	-
204.3	83.2	1.6	-	1.16	0.68	30.8	-
247.2	-	-	-	-	-	-	-
294.6	-	-	-	1.78	5.24	22.2	133
335.2	90.5	1.6	-	1.09	5.75	60.6	131
399.6	-	-	-	1.02	1.89	41.1	142
490.7	86.7	1.2	-	0.66	4.91	53.4	122

# USNS LYNCH 710-82 N. ATLANTIC

STATION 11 CAST 1B 14 JUNE 1982 1710 GMT

POSITION 26 00.0 N 60 00.0 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	10.1	10.0	26.040	26.038	36.383	24.067	4.74	-
2	23.0	22.8	25.570	25.565	36.449	24.263	4.82	-
3	32.0	31.8	24.760	24.753	36.601	24.627	4.89	-
4	48.1	47.7	24.540	24.530	36.678	24.752	4.94	-
5	64.0	63.5	24.210	24.196	36.836	24.971	4.94	-
6	78.0	77.4	23.800	23.784	36.899	25.141	4.92	-
7	92.0	91.3	23.290	23.271	36.870	25.270	4.88	-
8	108.0	107.2	22.870	22.848	36.931	25.438	4.73	-
9	122.0	121.0	22.320	22.295	36.902	25.574	4.68	-
10	126.0	125.0	22.070	22.045	36.856	25.611	4.70	-
11	150.0	148.8	21.004	20.975	36.755	25.831	4.68	-
12	175.0	173.6	20.480	20.447	36.838	26.037	4.35	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
10.0	0.11	1.86	0.03	0.14	0.15	0.010	0.007
22.8	0.11	1.96	0.06	0.14	0.16	0.013	0.005
31.8	0.11	1.96	0.09	0.14	0.14	0.011	0.008
47.7	0.11	1.92	0.09	0.14	0.17	0.012	0.012
63.5	0.11	1.89	0.09	0.14	0.25	0.029	0.021
77.4	0.11	1.82	0.09	0.14	0.25	0.039	0.030
91.3	0.08	1.72	0.09	0.14	0.16	0.054	0.041
107.2	0.11	1.75	0.12	0.14	0.33	0.077	0.105
121.0	0.08	1.72	0.12	0.14	0.17	0.131	0.212
125.0	0.08	1.72	0.12	0.15	0.15	0.142	0.194
148.8	0.07	1.61	0.30	0.21	0.18	0.082	0.170
173.6	0.11	1.61	1.50	0.16	0.16	0.025	0.053

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
10.0	91.3	3.2	-	3.35	-	25.1	145
22.8	94.5	2.7	10.58	7.99	2.59	30.0	135
31.8	94.5	2.5	14.20	10.89	3.31	31.9	121
47.7	-	-	12.30	9.59	2.71	32.5	116
63.5	108.7	2.4	14.94	11.59	3.35	36.8	116
77.4	-	-	9.05	5.05	4.00	37.4	90
91.3	79.2	2.3	10.42	6.09	4.33	37.7	131
107.2	76.6	1.8	15.22	8.63	6.59	68.3	106
121.0	79.5	1.8	12.93	4.88	8.05	32.8	244
125.0	75.9	1.9	12.45	3.55	8.90	43.4	115
148.8	114.1	1.6	6.80	3.81	2.99	38.0	212
173.6	-	-	13.06	5.68	7.38	35.7	110



# USNS LYNCH 710-82 N. ATLANTIC

STATION 11 CAST 2A 15 JUNE 1982 0200 GMT

POSITION 25 59.5 N 64 59.7 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
13	204.0	202.4	19.190	19.153	36.654	26.238	4.36	-
14	257.0	254.9	18.260	18.215	36.545	26.392	4.53	-
15	307.0	304.5	17.870	17.817	36.503	26.457	4.64	-
16	351.0	348.1	17.670	17.610	36.482	26.490	4.79	-
17	398.0	394.6	17.310	17.242	36.418	26.529	4.63	-
18	499.0	494.7	15.780	15.700	36.155	26.688	4.24	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
202.4	0.13	1.79	2.50	0.15	0.34	-	-
254.9	0.18	2.06	3.88	0.14	0.27	-	-
304.5	0.21	2.22	4.46	0.13	0.27	-	-
348.1	0.22	2.33	4.56	0.13	0.25	-	-
394.6	0.25	2.65	5.67	0.12	0.26	-	-
494.7	0.50	4.12	9.90	0.11	0.24	-	-

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	2-20u ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
202.4	76.6	2.1	-	6.35	-	29.4	116
254.9	-	-	-	1.43	-	28.4	293
304.5	-	-	-	2.88	2.08	28.4	244
348.1	131.5	2.1	-	1.52	1.35	24.9	107
394.6	-	-	-	1.59	0.98	26.4	135
494.7	63.8	1.5	-	0.81	-	25.4	140

## USNS LYNCH 710-82 N. ATLANTIC

STATION 11 CAST 2B 15 JUNE 1982 0320 GMT

POSITION 26 00.0N 65 00.0 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	10.3	10.2	26.090	26.088	35.381	23.295	4.67	-
2	22.4	22.2	25.410	25.405	36.437	24.304	4.80	-
3	29.8	29.6	25.070	25.063	36.561	24.502	4.87	-
4	45.9	45.5	24.581	24.571	36.719	24.770	4.88	-
5	61.2	60.7	24.150	24.137	36.846	24.997	4.94	-
6	79.8	79.2	23.881	23.864	36.915	25.129	4.92	-
7	95.6	94.9	23.120	23.100	36.869	25.319	4.88	-
8	109.3	108.4	22.790	22.768	36.935	25.465	4.74	-
9	125.0	124.0	22.100	22.075	36.898	25.634	4.67	-
10	128.9	127.9	21.760	21.734	36.854	25.696	4.67	-
11	145.2	144.1	20.770	20.742	36.726	25.873	4.70	-
12	175.0	173.6	20.260	20.227	36.828	26.089	4.37	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
10.2	0.14	1.97	0.06	0.13	0.35	0.008	0.008
22.2	0.14	1.79	0.19	0.15	0.30	0.011	0.011
29.6	0.12	1.70	0.23	0.15	0.32	0.012	0.008
45.5	0.09	1.61	0.19	0.15	0.27	0.014	0.011
60.7	0.17	1.61	0.19	0.16	0.92	0.273	0.164
79.2	0.07	1.49	0.14	0.15	0.38	0.032	0.013
94.9	0.08	1.40	0.11	0.15	0.28	0.044	0.053
108.4	0.08	1.34	0.10	0.15	0.35	0.066	0.074
124.0	0.09	1.29	0.16	0.17	0.45	0.153	0.197
127.9	0.08	1.34	0.23	0.18	0.28	0.088	0.136
144.1	0.08	1.34	0.32	0.24	0.42	0.044	0.166
173.6	0.07	1.43	1.95	0.16	0.28	0.010	0.030

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
10.2	83.6	1.9	5.30	4.05	1.24	47.5	105
22.2	144.6	2.3	6.08	3.77	2.31	35.5	105
29.6	97.0	2.3	24.22	18.88	5.34	38.1	110
45.5	-	-	7.74	5.51	2.23	36.7	105
60.7	211.2	2.4	29.32	29.13	0.20	38.3	102
79.2	-	-	15.20	10.86	4.34	39.8	197
94.9	106.0	1.8	7.45	3.59	3.86	38.2	-
108.4	85.9	1.9	20.11	17.14	2.96	37.9	113
124.0	91.8	2.0	60.81	54.56	6.25	34.2	114
127.9	95.4	2.0	33.82	21.89	1.93	36.7	118
144.1	80.0	1.2	10.78	9.01	1.77	37.6	115
173.6	-	-	8.33	3.18	5.15	35.1	140

# USNS LYNCH 710-82 N. ATLANTIC

STATION 12 CAST 2 15 JUNE 1982 2200 GMT

POSITION 26 00.6 N 67 31.3 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	18.5	18.4	25.890	25.886	36.674	24.333	4.81	-
2	31.5	31.3	24.220	24.213	36.732	24.889	5.05	-
3	53.0	52.6	23.100	23.089	36.733	25.221	5.12	-
4	61.5	61.0	22.860	22.847	36.723	25.283	5.12	-
5	83.0	82.4	21.660	21.644	36.699	25.607	5.12	-
6	104.0	103.2	21.000	20.980	36.710	25.798	4.94	-
7	117.2	116.3	20.590	20.568	36.703	25.904	4.81	-
8	134.5	133.4	20.040	20.015	36.675	26.031	4.67	-
9	157.3	156.1	19.520	19.491	36.672	26.166	4.51	-
10	203.7	202.1	18.620	18.584	36.577	26.326	4.61	-
11	353.7	350.7	17.610	17.549	36.470	26.496	4.85	-
12	497.0	492.7	15.850	15.770	36.161	26.677	4.33	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
18.4	0.19	1.74	0.10	0.15	0.64	0.006	0.008
31.3	0.08	1.62	0.07	0.13	0.31	0.011	0.005
52.6	0.08	1.65	0.07	0.14	0.25	-	-
61.0	0.06	1.57	0.07	0.14	0.21	0.027	0.016
82.4	0.08	1.65	0.08	0.14	0.21	0.034	0.022
103.2	0.09	1.65	0.08	0.14	0.40	0.047	0.054
116.3	0.08	1.65	0.20	0.16	0.22	0.158	0.212
133.4	0.06	1.74	0.93	0.17	0.21	0.104	0.176
156.1	0.10	1.86	2.16	0.16	0.22	0.041	0.124
202.1	0.17	2.09	3.58	0.15	0.43	0.007	0.011
350.7	0.28	2.61	5.25	0.15	0.55	-	0.003
492.7	0.48	4.35	10.50	0.15	0.33	-	-

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
18.4	133.8	2.3	-	6.32	-	32.8	110
31.3	116.5	2.4	15.35	5.21	10.14	42.5	109
52.6	110.5	3.1	10.64	8.91	1.73	41.0	99
61.0	101.3	3.1	14.89	9.97	4.92	44.1	119
82.4	101.4	2.9	9.01	6.98	2.03	51.2	120
103.2	130.5	2.0	15.05	11.71	3.34	41.2	118
116.3	102.0	3.6	34.87	26.55	8.32	38.9	119
133.4	99.7	1.8	8.35	4.59	3.76	45.5	118
156.1	87.9	1.6	5.08	3.46	1.62	40.5	135
202.1	84.8	1.7	7.41	2.30	5.12	44.8	126
350.7	73.3	2.1	2.18	0.84	1.34	37.9	140
492.7	75.5	1.9	5.56	0.97	4.59	33.3	167

# USNS LYNCH 710-82 N. ATLANTIC

STATION 12 CAST 3 15 JUNE 1982 2005 GMT

POSITION 26 03.7 N 67 31.6 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	14.9	14.8	25.750	25.747	36.622	24.338	-	33
2	30.0	29.8	24.010	24.004	36.705	24.932	-	33
3	45.0	44.7	23.120	23.111	36.685	25.179	-	37
4	58.0	57.6	22.580	22.568	36.726	25.366	-	36
5	79.9	79.3	21.461	21.445	36.712	25.672	-	27
6	100.0	99.2	20.938	20.919	36.705	25.811	-	23
7	115.9	115.0	20.430	20.408	36.692	25.939	-	37
8	137.0	135.9	19.830	19.805	36.685	26.094	-	18
9	164.0	162.7	19.180	19.150	36.621	26.215	-	20
10	200.0	198.4	18.580	18.544	36.565	26.327	-	13
11	350.0	347.1	17.600	17.540	36.466	26.495	-	21
12	498.9	494.6	15.760	15.680	36.147	26.686	-	7

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
14.8	-	-	-	-	-	-	-
29.8	-	-	-	-	-	-	-
44.7	-	-	-	-	-	-	-
57.6	-	-	-	-	-	-	-
79.3	-	-	-	-	-	-	-
99.2	-	-	-	-	-	-	-
115.0	-	-	-	-	-	-	-
135.9	-	-	-	-	-	-	-
162.7	-	-	-	-	-	-	-
198.4	-	-	-	-	-	-	-
347.1	-	-	-	-	-	-	-
494.6	-	-	-	-	-	-	-

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
14.8	-	-	-	-	-	-	-
29.8	-	-	-	-	-	-	-
44.7	-	-	-	-	-	-	-
57.6	-	-	-	-	-	-	-
79.3	-	-	-	-	-	-	-
99.2	-	-	-	-	-	-	-
115.0	-	-	-	-	-	-	-
135.9	-	-	-	-	-	-	-
162.7	-	-	-	-	-	-	-
198.4	-	-	-	-	-	-	-
347.1	-	-	-	-	-	-	-
494.6	-	-	-	-	-	-	-

# USNS LYNCH 710-82 N. ATLANTIC

STATION 13

CAST 1A

17 JUNE 1982

0200 GMT

POSITION 26 00.0 N 70 00.0 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
13	191.9	190.4	19.840	19.804	36.700	26.103	4.39	-
14	221.0	219.2	19.150	19.110	36.612	26.216	4.62	-
15	254.0	251.9	18.630	18.585	36.578	26.324	4.58	-
16	304.0	301.5	18.151	18.098	36.535	26.412	4.77	-
17	362.0	359.0	17.910	17.847	36.515	26.456	4.86	-
18	499.0	494.7	16.770	16.687	36.319	26.583	4.51	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
190.4	0.15	1.64	1.51	0.16	0.40	-	-
219.2	0.15	1.66	1.54	0.15	0.22	-	-
251.9	0.15	1.82	2.37	0.14	0.19	-	-
301.5	0.16	2.05	3.11	0.14	0.15	-	-
359.0	0.17	2.14	3.24	0.14	0.25	-	-
494.7	0.36	3.20	6.32	0.14	0.22	-	-

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
190.4	65.3	2.0	-	-	-	76.0	128
219.2	-	-	-	-	-	46.4	183
251.9	-	-	-	-	-	45.3	212
301.5	-	-	-	-	-	42.8	120
359.0	56.5	0.8	-	-	-	44.3	124
494.7	64.4	1.2	-	-	-	42.8	131

# USNS LYNCH 710-82 N. ATLANTIC

STATION 13

CAST 1B

17 JUNE 1982

0345 GMT

POSITION 26 00.0 N 70 00.0 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	6.0	6.0	27.061	27.060	36.531	23.854	4.72	-
2	21.0	20.8	26.510	26.505	36.514	24.017	4.77	-
3	36.1	35.8	25.270	25.262	36.650	24.508	4.96	-
4	47.0	46.6	24.430	24.420	36.707	24.807	5.03	-
5	61.0	60.5	23.940	23.927	36.723	24.966	5.05	-
6	81.0	80.4	23.030	23.013	36.735	25.243	5.13	-
7	96.0	95.3	22.520	22.500	36.734	25.390	5.11	-
8	117.0	116.1	21.850	21.827	36.737	25.582	4.95	-
9	133.0	132.0	21.280	21.254	36.785	25.778	4.67	-
10	137.1	136.0	21.220	21.193	36.770	25.783	4.70	-
11	143.1	142.0	21.030	21.002	36.743	25.815	4.80	-
12	153.0	151.8	20.710	20.681	36.704	25.872	4.96	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
6.0	0.13	1.92	0.13	0.14	0.18	0.011	0.005
20.8	0.15	1.78	0.15	0.13	0.19	0.017	0.065
35.8	0.15	1.82	0.16	0.13	0.18	0.014	0.008
46.6	0.13	1.78	0.16	0.14	0.17	0.014	0.008
60.5	0.14	1.82	0.16	0.14	0.23	0.034	0.016
80.4	0.14	1.71	0.16	0.14	0.17	0.052	0.032
95.3	0.13	1.74	0.16	0.14	0.17	0.061	0.043
116.1	0.10	1.67	0.16	0.13	0.17	0.088	0.101
132.0	0.11	1.64	0.31	0.21	0.21	0.138	0.227
136.0	0.12	1.67	0.31	0.21	0.20	0.126	0.238
142.0	0.10	1.64	0.31	0.22	0.21	0.115	0.207
151.8	0.11	1.66	0.32	0.25	0.25	0.087	0.171

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
6.0	81.9	2.0	-	-	-	43.1	106
20.8	86.6	2.2	-	-	-	45.3	124
35.8	84.8	2.1	-	-	-	51.3	90
46.6	-	-	-	-	-	49.9	104
60.5	110.0	2.0	-	-	-	52.8	105
80.4	-	-	-	-	-	51.0	115
95.3	87.4	2.1	-	-	-	52.5	105
116.1	76.6	3.1	-	-	-	55.6	98
132.0	89.6	1.5	-	-	-	55.3	98
136.0	82.0	2.6	-	-	-	55.3	116
142.0	56.5	1.4	-	-	-	54.1	170
151.8	-	-	-	-	-	53.0	113

# USNS LYNCH 710-82 N. ATLANTIC

STATION 13 CAST 2A 17 JUNE 1982 0900 GMT

POSITION 25 58.0 N 70 02.0 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	8.7	8.6	27.040	27.038	36.554	23.878	4.79	-
2	28.0	27.8	26.180	26.174	36.554	24.152	4.89	-
3	36.0	35.7	25.140	25.132	36.661	24.556	5.05	-
4	50.0	49.6	24.400	24.389	36.697	24.809	5.09	-
5	67.0	66.5	23.780	23.766	36.718	25.010	5.14	-
6	84.0	83.3	23.050	23.033	36.716	25.223	5.16	-
7	103.0	102.2	22.250	22.229	36.713	25.451	5.06	-
8	119.0	118.1	21.720	21.696	36.754	25.632	4.91	-
9	122.0	121.0	21.700	21.676	36.748	25.633	4.95	-
10	125.0	124.0	21.530	21.505	36.772	25.698	4.83	-
11	153.0	151.8	20.920	20.890	36.769	25.865	4.62	-
12	202.0	200.4	19.631	19.594	36.665	26.131	4.58	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
8.6	0.23	2.04	0.10	0.15	0.60	0.011	0.007
27.8	0.08	1.98	0.07	0.14	0.18	0.014	0.008
35.7	0.27	1.95	0.07	0.15	0.58	0.015	0.007
49.6	0.10	1.86	0.07	0.15	0.16	0.013	0.008
66.5	0.10	1.68	0.08	0.15	0.18	0.037	0.010
83.3	0.08	1.68	0.08	0.15	0.22	0.049	0.022
102.2	0.08	1.68	0.08	0.15	0.16	0.098	0.048
118.1	0.08	1.73	0.08	0.15	0.22	0.137	0.136
121.0	0.08	1.77	0.12	0.16	0.18	0.109	0.143
124.0	0.09	1.68	0.16	0.17	0.25	0.071	0.300
151.8	0.09	1.72	0.78	0.21	0.22	0.082	0.142
200.4	0.20	1.95	1.86	0.17	0.38	0.017	0.031

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
8.6	115.8	2.2	5.28	4.85	0.42	43.8	-
27.8	99.3	2.2	8.81	5.48	3.33	50.2	-
35.7	104.5	2.2	6.95	5.07	1.88	50.2	122
49.6	96.2	2.1	7.41	4.95	2.46	47.3	184
66.5	91.9	2.9	8.71	6.10	2.60	52.6	172
83.3	80.6	1.9	9.54	6.48	3.06	57.1	-
102.2	99.0	2.0	5.64	2.12	3.51	75.3	303
118.1	136.3	2.0	12.07	8.25	3.83	50.5	-
121.0	89.7	1.6	9.72	3.58	6.14	40.3	-
124.0	89.4	1.8	12.03	6.26	5.76	22.5	33
151.8	73.0	1.9	6.13	3.88	2.25	62.4	338
200.4	69.1	1.4	33.37	6.63	26.73	53.1	-

USNS LYNCH 710-82 N. ATLANTIC

STATION 14 CAST 1 18 JUNE 1982 1500 GMT

POSITION 26 00.0 N 72 30.0 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	7.0	6.9	27.330	27.328	36.461	23.714	4.81	-
2	23.0	22.8	27.077	27.072	36.480	23.810	4.98	-
3	43.0	42.7	25.720	25.710	36.604	24.334	4.99	-
4	66.0	65.5	24.950	24.936	36.639	24.598	5.09	-
5	76.5	75.9	24.680	24.663	36.678	24.709	5.24	-
6	101.0	100.2	23.700	23.679	36.730	25.043	5.10	-
7	118.0	117.1	23.110	23.086	36.780	25.254	4.97	-
8	127.4	126.4	22.750	22.724	36.737	25.326	5.10	-
9	154.5	153.3	21.670	21.639	36.796	25.678	4.85	-
10	174.5	173.1	20.950	20.916	36.800	25.880	4.58	-
11	204.0	202.4	19.970	19.932	36.681	26.054	4.69	-
12	357.5	354.5	17.830	17.768	36.491	26.458	4.73	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
6.9	0.18	2.02	0.05	0.14	0.24	0.011	0.007
22.8	0.20	2.05	0.06	0.14	0.22	0.014	0.008
42.7	0.26	1.80	0.02	0.14	0.22	0.018	0.010
65.5	0.27	1.67	0.09	0.14	0.15	0.030	0.015
75.9	0.32	1.76	0.13	0.14	0.34	0.042	0.025
100.2	0.40	1.58	0.11	0.14	0.67	0.068	0.049
117.1	0.32	1.50	0.11	0.14	0.17	0.077	0.105
126.4	0.38	1.58	0.13	0.16	0.44	0.115	0.277
153.3	0.34	1.50	0.40	0.21	0.32	0.060	0.129
173.1	0.34	1.50	1.03	0.18	0.27	0.027	0.124
202.4	0.39	1.58	1.34	0.16	0.48	0.019	0.053
354.5	0.50	2.29	4.98	0.14	0.25	0.001	0.004

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
6.9	99.9	2.4	4.07	3.08	0.99	37.7	94
22.8	111.1	2.3	6.75	4.68	2.07	55.9	381
42.7	103.0	2.4	3.90	2.38	1.51	40.5	249
65.5	97.1	2.3	8.03	5.53	2.50	34.6	41
75.9	88.6	2.3	5.62	4.31	1.31	57.9	126
100.2	91.0	3.2	12.21	7.54	4.67	43.5	103
117.1	81.7	1.7	4.93	2.33	2.60	36.8	42
126.4	99.4	1.3	14.09	9.85	4.24	45.1	76
153.3	92.1	1.1	6.82	4.92	1.90	60.4	30
173.1	81.5	1.3	6.16	3.70	2.46	42.4	122
202.4	84.8	1.1	9.19	4.71	4.48	41.0	237
354.5	53.8	1.1	8.38	2.17	6.17	38.2	86



# USNS LYNCH 710-82 N. ATLANTIC

STATION 14 CAST 3L 18 JUNE 1982 1835 GMT

POSITION 26 00.0 N 72 30.0 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	515.0	510.5	16.090	16.007	36.196	26.648	4.27	-
2	720.6	714.0	11.840	11.744	35.542	27.041	3.54	-
3	931.6	922.6	7.780	7.683	35.038	27.337	3.31	-
4	1030.0	1019.8	6.680	6.580	35.010	27.471	3.88	-
5	1516.0	1499.4	4.330	4.205	35.015	27.763	6.03	-
6	1847.0	1825.4	3.880	3.729	34.994	27.794	6.23	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
510.5	0.47	4.14	9.74	0.14	0.15	-	-
714.0	1.15	10.00	20.70	0.13	0.14	-	-
922.6	1.89	19.40	27.80	0.13	0.15	-	-
1019.8	1.91	19.70	26.40	0.12	0.13	-	-
1499.4	1.36	13.60	19.10	0.12	0.17	-	-
1825.4	1.24	15.00	18.90	0.12	0.18	-	-

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
510.5	62.0	1.5	-	-	-	-	-
714.0	73.1	1.7	-	-	-	-	-
922.6	69.8	1.2	-	-	-	-	-
1019.8	44.6	0.4	-	-	-	-	-
1499.4	20.4	1.6	-	-	-	-	-
1825.4	57.0	0.6	-	-	-	-	-

USNS LYNCH 710-82 N. ATLANTIC

STATION 15 CAST 1A 19 JUNE 1982 1445 GMT

POSITION 26 00.7 N 75 10.4 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
13	180.0	178.6	21.700	21.664	36.750	25.634	4.49	-
14	200.2	198.6	20.848	--	--	--	-	-
15	308.0	305.5	18.419	18.365	36.554	26.359	4.71	-
16	347.0	344.1	18.070	18.009	36.524	26.424	4.90	-
17	494.7	490.4	17.120	17.036	36.379	26.545	4.62	-
18	501.4	497.0	17.086	17.001	36.750	26.839	4.74	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
178.6	0.68	1.69	1.26	0.17	0.29	0.079	0.201
198.6	-	-	-	-	-	-	-
305.5	0.76	2.06	3.54	0.15	0.27	0.066	0.151
344.1	0.74	2.28	4.24	0.15	0.22	-	-
490.4	0.82	3.04	7.00	0.16	0.25	-	-
497.0	0.70	1.63	0.80	0.18	0.23	-	-

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
178.6	65.2	2.1	-	1.33	2.81	54.3	59
198.6	-	-	-	-	-	-	-
305.5	-	-	-	2.11	6.49	49.0	27
344.1	-	-	-	1.41	2.90	37.1	169
490.4	77.0	0.9	-	2.53	-	41.3	222
497.0	69.4	1.3	-	4.88	-	47.9	291

# USNS LYNCH 710-82 N. ATLANTIC

STATION 15                      CAST 1B                      19 JUNE 1982                      1710 GMT

POSITION 26 00.0 N 75 12.0 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	6.7	6.6	27.095	27.093	36.580	23.880	4.73	-
2	15.6	15.5	27.065	27.061	36.578	23.888	4.83	-
3	22.7	22.5	27.044	27.039	36.578	23.895	4.85	-
4	28.7	28.5	27.011	27.004	36.577	23.905	4.87	-
5	33.6	33.3	26.910	26.902	36.565	23.928	4.98	-
6	42.0	41.7	25.563	25.554	36.560	24.349	5.04	-
7	54.7	54.3	25.330	25.318	36.604	24.454	5.06	-
8	71.6	71.0	24.960	24.944	36.604	24.568	5.09	-
9	90.0	89.3	24.260	24.241	36.611	24.785	5.13	-
10	114.2	113.3	23.790	23.766	36.668	24.969	5.00	-
11	142.0	140.9	22.800	22.771	36.712	25.292	4.90	-
12	159.7	158.4	22.220	22.188	36.746	25.484	4.86	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
6.6	0.86	2.06	0.04	0.14	-	0.027	0.061
15.5	0.64	2.06	0.04	0.14	0.24	0.002	0.025
22.5	0.68	1.95	0.02	0.13	0.25	0.009	0.015
28.5	0.99	2.17	0.04	0.14	-	0.014	0.016
33.3	0.66	1.95	0.04	0.13	0.33	0.152	0.203
41.7	0.66	1.84	0.02	0.13	0.26	0.015	0.015
54.3	0.69	1.89	0.10	0.11	-	0.014	0.017
71.0	0.57	1.84	0.04	0.10	0.43	0.036	0.013
89.3	0.59	1.80	0.04	0.10	0.66	0.032	0.033
113.3	0.54	1.74	0.06	0.11	1.09	0.058	0.039
140.9	0.51	1.69	0.36	0.22	1.26	0.083	0.078
158.4	0.46	1.69	0.46	0.21	0.48	0.146	0.200

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
6.6	90.5	2.2	5.54	4.50	1.04	33.5	58
15.5	101.3	1.9	10.15	7.95	2.20	45.4	377
22.5	-	-	8.31	6.40	1.91	34.1	-
28.5	84.3	2.2	8.80	6.29	2.51	44.3	16
33.3	94.9	1.6	14.64	6.83	7.81	45.7	31
41.7	110.8	2.6	15.93	10.00	5.93	42.4	74
54.3	96.6	2.4	24.04	18.09	5.95	57.0	88
71.0	116.6	1.8	13.55	8.36	5.19	33.0	53
89.3	84.7	1.7	13.89	8.61	5.28	47.1	22
113.3	-	-	12.13	7.69	4.44	74.2	327
140.9	99.0	1.4	8.26	3.42	4.83	46.6	34
158.4	-	-	15.15	6.21	8.93	36.0	453

USNS LYNCH 710-82 N. ATLANTIC

STATION 15 CAST 1C 19 JUNE 1982 2015 GMT

POSITION 25 59.5 N 75 11.7W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
2	36.0	35.7	25.700	25.692	36.559	24.306	-	0
3	37.1	36.8	25.699	25.691	36.575	24.318	-	0

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
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35.7	-	-	-	-	-	-	-
36.8	-	-	-	-	-	-	-

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
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35.7	-	-	-	-	-	-	-
36.8	-	-	-	-	-	-	-

# USNS LYNCH 710-82 N. ATLANTIC

STATION 16                      CAST 1B                      20 JUNE 1982                      1705 GMT

POSITION 28 20.5 N 74 19.8 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
0	0.0	0.0	26.620	--	--	--	-	-
1	9.3	9.2	26.667	26.665	36.270	23.783	4.80	-
2	17.7	17.6	26.560	26.556	36.327	23.860	4.84	-
3	45.8	45.4	25.280	25.270	36.370	24.293	4.89	-
4	66.5	66.0	23.830	23.816	36.555	24.871	4.95	-
5	82.7	82.1	23.410	23.393	36.693	25.100	4.83	-
6	102.7	101.9	22.710	22.689	36.641	25.264	4.94	-
7	129.7	128.7	21.940	21.914	36.665	25.502	4.76	-
8	169.8	168.5	20.450	20.418	36.651	25.902	4.23	-
9	199.1	197.5	19.730	19.693	36.624	26.074	4.73	-
10	243.7	241.7	18.920	18.876	36.579	26.250	4.68	-
11	366.0	362.9	17.950	17.886	36.515	26.447	4.83	-
12	1998.6	1974.5	3.760	3.596	34.995	27.807	6.21	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
0.0	0.18	2.04	0.10	0.14	0.43	0.038	0.022
9.2	0.09	1.77	0.05	0.12	0.27	0.037	0.021
17.6	0.10	1.77	0.08	0.11	0.20	0.051	0.052
45.4	0.08	1.70	0.05	0.10	0.19	0.126	0.049
66.0	0.10	1.22	0.03	0.11	0.22	0.120	0.076
82.1	0.10	1.50	0.10	0.16	0.22	0.351	0.292
101.9	0.09	1.36	0.29	0.24	0.25	0.170	0.173
128.7	0.09	1.53	0.62	0.24	0.20	0.109	0.227
168.5	0.22	2.18	2.96	0.13	0.19	0.024	0.068
197.5	0.15	1.84	1.69	0.12	0.20	0.011	0.021
241.7	0.16	1.94	2.29	0.12	0.23	0.033	0.013
362.9	0.20	2.14	3.22	0.12	0.30	0.003	0.011
1974.5	1.02	16.50	13.90	0.11	0.20	0.002	0.003

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
0.0	-	-	-	-	-	-	-
9.2	131.6	2.6	9.83	4.45	5.38	31.8	304
17.6	105.5	4.0	17.24	13.39	3.85	30.1	-
45.4	114.5	3.3	12.55	7.65	4.91	33.0	275
66.0	101.4	2.6	9.94	5.18	4.76	53.0	255
82.1	94.6	2.4	21.41	17.39	4.02	40.0	12
101.9	81.7	2.5	18.10	8.94	9.16	40.4	151
128.7	91.0	1.6	12.82	8.63	4.19	41.3	454
168.5	79.1	1.1	8.04	5.56	2.48	67.0	172
197.5	87.7	1.2	7.69	1.58	6.11	39.8	243
241.7	77.9	1.7	8.38	2.72	5.66	38.7	386
362.9	64.4	1.0	9.78	2.62	7.16	33.8	34
1974.5	-	-	-	-	-	-	85

# USNS LYNCH 710-82 N. ATLANTIC

STATION 16 CAST 2A 20 JUNE 1982 0130 GMT

POSITION 28 24.2 N 74 14.8 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	11.2	11.1	26.530	26.527	36.340	23.880	4.77	-
2	32.0	31.8	26.170	26.163	36.384	24.027	4.83	-
3	45.8	45.4	25.280	25.270	36.543	24.424	4.83	-
4	63.5	63.0	23.920	23.907	36.644	24.912	4.93	-
5	82.1	81.5	23.160	23.143	36.715	25.190	4.71	-
6	108.0	107.2	22.760	22.738	36.700	25.295	4.74	-
7	130.3	129.3	22.110	22.084	36.680	25.465	4.71	-
8	164.0	162.7	20.830	20.798	36.681	25.822	4.40	-
9	196.7	195.1	19.840	19.803	36.616	26.039	4.52	-
10	251.5	249.5	18.910	18.865	36.577	26.251	4.65	-
11	366.0	362.9	17.930	17.866	36.516	26.452	5.04	-
12	499.5	495.2	17.240	17.155	36.416	26.545	4.99	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
11.1	0.09	1.75	0.03	0.12	0.28	0.024	0.022
31.8	0.08	1.92	0.03	0.12	0.35	0.054	0.048
45.4	0.05	1.72	0.03	0.12	0.26	0.086	0.096
63.0	0.06	1.50	0.06	0.14	0.27	0.232	0.217
81.5	0.06	1.68	0.53	0.27	0.22	0.131	0.198
107.2	0.06	1.64	0.74	0.24	0.24	0.109	0.094
129.3	0.08	1.78	1.05	0.23	0.22	0.071	0.111
162.7	0.15	2.03	2.29	0.12	0.52	0.029	0.062
195.1	0.12	2.10	2.42	0.10	0.25	0.007	0.033
249.5	0.11	2.06	2.60	0.09	0.29	0.004	0.018
362.9	0.11	2.10	3.22	0.10	0.28	0.001	0.011
495.2	0.15	2.84	3.94	0.10	0.22	0.002	0.010

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
11.1	-	-	-	-	-	-	-
31.8	-	-	-	-	-	-	-
45.4	-	-	-	-	-	-	-
63.0	-	-	-	-	-	-	-
81.5	-	-	-	-	-	-	-
107.2	-	-	-	-	-	-	-
129.3	-	-	-	-	-	-	-
162.7	-	-	-	-	-	-	-
195.1	-	-	-	-	-	-	-
249.5	-	-	-	-	-	-	-
362.9	-	-	-	-	-	-	-
495.2	-	-	-	-	-	-	-

# USNS LYNCH 710-82 N. ATLANTIC

STATION 17                      CAST 1                      21 JUNE 1982                      1930 GMT

POSITION 30 49.5 N 73 34.7 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	8.1	8.0	25.060	25.058	36.318	24.321	5.03	-
2	28.0	27.8	24.530	24.524	36.341	24.500	5.07	-
3	46.8	46.4	21.400	21.391	36.599	25.603	5.61	-
4	67.1	66.6	20.650	20.637	36.611	25.818	5.51	-
5	84.0	83.3	20.081	20.065	36.603	25.965	5.30	-
6	122.0	121.0	19.130	19.108	36.581	26.198	5.16	-
7	139.5	138.4	18.910	18.885	36.573	26.248	5.19	-
8	160.3	159.0	18.660	18.631	36.565	26.306	4.93	-
9	177.2	175.8	18.460	18.429	36.551	26.346	4.88	-
10	205.0	203.4	18.140	18.104	36.529	26.410	4.90	-
11	356.3	353.3	17.150	17.090	36.697	26.782	4.98	-
12	498.7	494.4	15.020	14.943	36.013	26.750	4.23	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
8.0	0.05	1.12	0.21	0.11	0.27	0.013	0.003
27.8	0.05	1.08	0.21	0.10	0.23	0.019	0.008
46.4	0.05	1.05	0.24	0.10	0.26	0.070	0.035
66.6	0.07	1.05	0.14	0.11	0.27	0.175	0.129
83.3	0.08	1.12	0.18	0.13	0.26	0.216	0.330
121.0	0.08	1.40	1.05	0.21	0.23	0.093	0.156
138.4	0.13	1.47	1.30	0.20	0.25	0.042	0.081
159.0	0.13	1.78	1.68	0.15	0.23	0.051	0.046
175.8	0.12	1.85	1.68	0.13	0.23	0.023	0.033
203.4	0.18	2.06	2.28	0.14	0.23	0.008	0.013
353.3	0.14	2.69	3.08	0.18	0.25	0.002	0.007
494.4	0.40	5.41	7.00	0.21	0.27	0.004	0.021

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
8.0	89.3	4.9	18.34	15.31	3.04	44.5	58
27.8	99.0	4.8	16.88	13.83	3.05	50.7	3
46.4	75.5	7.9	22.27	12.68	9.59	57.4	307
66.6	79.3	4.4	21.38	16.37	5.01	56.9	199
83.3	72.3	4.3	24.55	22.81	1.74	47.6	527
121.0	75.5	2.3	21.06	13.87	7.19	47.8	23
138.4	99.0	1.9	8.95	7.52	1.43	53.8	79
159.0	88.7	2.1	6.45	4.35	2.10	53.0	32
175.8	99.0	2.2	6.89	3.68	3.21	61.3	31
203.4	67.9	2.8	6.71	2.64	4.07	56.1	269
353.3	70.2	1.1	12.78	2.05	10.93	46.0	288
494.4	38.7	1.9	7.18	1.57	5.61	41.3	394

USNS LYNCH 710-82 N. ATLANTIC

STATION 17 CAST 2 21 JUNE 1982 2215 GMT

POSITION 30 52.0 N 73 35.3 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	45.9	45.5	21.545	21.536	36.595	25.559	-	75
2	69.5	69.0	20.299	20.286	36.605	25.908	-	48
3	90.0	89.3	19.634	19.617	36.612	26.090	-	37
4	110.0	109.1	19.166	19.146	36.599	26.202	-	28
5	130.2	129.2	18.849	18.826	36.580	26.269	-	23
6	156.8	155.6	18.612	18.584	36.566	26.319	-	21
7	203.3	201.7	18.133	18.098	36.528	26.411	-	15
8	489.5	485.3	15.015	14.940	36.018	26.755	-	12
9	746.5	739.6	9.506	9.418	36.246	28.011	-	15
10	999.7	989.9	5.401	5.314	35.058	27.674	-	9
11	1999.7	1975.6	3.664	3.501	34.992	27.815	-	8
12	1999.7	1975.6	3.664	3.501	34.992	27.815	-	8

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
45.5	0.07	0.87	0.35	0.14	0.27	-	-
69.0	0.07	0.87	0.35	0.14	0.23	-	-
89.3	0.14	1.12	0.70	0.18	0.39	-	-
109.1	0.12	1.26	1.05	0.26	0.25	-	-
129.2	0.14	1.40	1.40	0.16	0.23	-	-
155.6	0.19	1.50	1.78	0.15	0.30	-	-
201.7	0.24	1.81	2.48	0.13	0.25	-	-
485.3	0.73	5.17	6.30	0.13	0.37	-	-
739.6	1.35	15.10	12.20	0.12	0.22	-	-
989.9	1.34	14.30	10.30	0.12	0.36	-	-
1975.6	1.06	17.20	9.48	0.12	0.30	-	-
1975.6	1.16	17.00	9.48	0.14	0.16	-	-

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
45.5	-	-	-	-	-	-	-
69.0	-	-	-	-	-	-	-
89.3	-	-	-	-	-	-	-
109.1	-	-	-	-	-	-	-
129.2	-	-	-	-	-	-	-
155.6	-	-	-	-	-	-	-
201.7	-	-	-	-	-	-	-
485.3	-	-	-	-	-	-	-
739.6	-	-	-	-	-	-	-
989.9	-	-	-	-	-	-	-
1975.6	-	-	-	-	-	-	-
1975.6	-	-	-	-	-	-	-



# USNS LYNCH 710-82 N. ATLANTIC

STATION 18

CAST 1

22 JUNE 1982

1705 GMT

POSITION 33 12.9 N 72 48.4 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	40.1	39.8	23.613	23.605	36.636	24.997	4.98	-
2	53.9	53.5	22.577	22.566	36.627	25.292	5.01	-
3	70.5	70.0	21.378	21.364	36.609	25.617	5.06	-
4	79.2	78.6	20.685	20.670	36.628	25.821	5.19	-
5	79.2	78.6	20.685	20.670	36.628	25.821	5.11	-
6	100.3	99.5	19.911	19.892	36.587	25.998	5.05	-
7	124.2	123.2	19.397	19.374	36.596	26.140	4.81	-
8	151.2	150.0	19.177	19.150	36.591	26.193	4.71	-
9	202.0	200.4	18.514	18.478	36.558	26.338	4.84	-
10	370.2	367.1	17.933	17.869	36.523	26.457	4.76	-
11	502.1	497.7	17.304	17.219	36.413	26.527	4.56	-
12	502.1	497.7	17.304	17.219	36.417	26.530	4.61	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
39.8	0.03	1.35	0.03	0.15	0.28	0.044	0.017
53.5	0.35	1.39	0.03	0.16	1.01	0.064	0.015
70.0	0.10	1.15	0.03	0.15	0.49	0.096	0.031
78.6	0.06	1.15	0.03	0.15	0.28	0.194	0.035
78.6	0.02	1.15	0.03	0.16	0.27	0.353	0.083
99.5	0.03	1.11	0.03	0.19	0.29	0.369	0.217
123.2	0.17	1.53	1.10	0.28	0.44	0.222	0.144
150.0	0.02	1.74	1.35	0.20	0.25	0.173	0.085
200.4	0.11	1.74	1.88	0.15	0.30	0.049	0.035
367.1	0.10	2.19	3.61	0.15	0.31	0.004	0.016
497.7	0.12	2.78	5.68	0.15	0.24	0.003	0.009
497.7	0.12	2.74	5.59	0.15	0.24	-	-

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
39.8	85.1	2.8	59.20	58.79	0.41	59.1	-
53.5	86.9	2.9	16.50	14.73	1.77	49.4	-
70.0	94.5	2.8	16.24	11.13	5.11	54.4	-
78.6	99.2	3.2	19.19	12.63	6.57	55.2	-
78.6	101.4	2.3	14.06	10.32	3.74	61.0	-
99.5	97.3	2.3	19.20	10.10	9.09	57.3	-
123.2	93.2	1.5	13.34	7.73	5.61	49.6	-
150.0	81.4	1.8	18.99	6.72	12.26	61.0	-
200.4	80.2	1.6	8.88	2.26	6.62	51.1	-
367.1	62.5	0.8	3.55	2.31	1.25	63.1	-
497.7	74.8	0.8	7.37	3.84	3.54	50.0	-
497.7	68.8	0.8	15.34	2.23	13.12	48.4	-

# USNS LYNCH 710-82 N. ATLANTIC

STATION 18 CAST 2 22 JUNE 1982 1830 GMT

POSITION 33 12.3 N 72 47.1 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
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1	57.8	57.4	21.890	21.879	36.601	25.467	-	-
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DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
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57.4	-	-	-	-	-	-	-
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DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
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57.4	-	-	-	-	-	-	-
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# USNS LYNCH 710-82 N. ATLANTIC

STATION 18 CAST 3 22 JUNE 1982 2015 GMT

POSITION 33 12.0 N 72 46.4 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	1473.7	1457.7	4.720	4.594	35.035	27.735	-	-
2	194.8	193.2	18.540	18.505	36.556	26.330	-	-
3	60.7	60.2	21.760	21.748	36.605	25.507	-	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
1457.7	-	-	-	-	-	-	-
193.2	-	-	-	-	-	-	-
60.2	-	-	-	-	-	-	-

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
1457.7	-	-	-	-	-	-	-
193.2	-	-	-	-	-	-	-
60.2	-	-	-	-	-	-	-

# USNS LYNCH 710-82 N. ATLANTIC

STATION 19 CAST 2 23 JUNE 1982 0645 GMT

POSITION 33 55.4 N 73 14.0 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	7.1	7.0	24.260	24.258	36.686	24.842	4.91	-
2	25.7	25.5	23.880	23.875	36.691	24.960	4.83	-
3	45.4	45.1	23.150	23.141	36.708	25.188	5.05	-
4	60.2	59.7	22.210	22.198	36.709	25.459	5.16	-
5	82.3	81.7	20.860	20.844	36.663	25.800	5.15	-
6	101.8	101.0	20.130	20.111	36.627	25.970	5.11	-
7	137.1	136.0	19.550	19.525	36.618	26.117	4.98	-
8	159.8	158.5	19.180	19.151	36.598	26.198	4.82	-
9	175.5	174.1	19.050	19.018	36.600	26.233	4.67	-
10	187.1	185.6	18.940	18.906	36.586	26.251	4.80	-
11	243.9	241.9	18.420	18.377	36.550	26.356	5.03	-
12	355.8	352.8	17.930	17.868	36.517	26.453	4.79	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
7.0	0.15	1.40	0.07	0.14	0.16	0.019	0.012
25.5	0.13	1.40	0.07	0.14	0.14	0.200	0.100
45.1	0.14	1.34	0.07	0.14	0.15	0.035	0.018
59.7	0.15	1.30	0.07	0.14	0.13	0.046	0.029
81.7	0.16	1.16	0.04	0.14	0.19	0.115	0.074
101.0	0.16	1.13	0.04	0.16	0.23	0.120	0.233
136.0	0.14	1.27	0.38	0.22	0.17	0.068	0.194
158.5	0.16	1.40	1.19	0.17	0.19	0.037	0.092
174.1	0.16	1.48	1.82	0.16	0.21	0.023	0.076
185.6	0.13	1.48	1.72	0.17	0.16	0.014	0.043
241.9	0.20	1.65	2.28	0.16	0.38	0.003	0.010
352.8	0.16	1.97	3.99	0.15	0.14	0.001	0.005

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
7.0	100.3	2.8	17.52	12.76	4.77	36.2	-
25.5	89.0	2.2	12.59	9.78	2.82	38.0	-
45.1	95.0	2.9	18.89	13.43	5.46	46.2	-
59.7	96.5	2.9	23.20	16.65	6.55	60.7	-
81.7	84.4	2.6	15.30	11.88	3.43	58.0	-
101.0	99.0	1.9	17.73	12.70	5.03	45.0	-
136.0	74.9	1.6	10.22	8.29	1.93	41.9	-
158.5	96.0	1.6	10.44	7.59	2.85	41.9	-
174.1	110.6	1.5	-	-	-	48.9	-
185.6	85.6	1.0	40.56	33.59	6.97	48.6	-
241.9	99.0	1.0	6.61	2.86	3.75	38.6	-
352.8	68.8	1.1	11.17	4.04	7.12	35.0	-

# USNS LYNCH 710-82 N. ATLANTIC

STATION 20 CAST 2 23 JUNE 1982 1915 GMT

POSITION 34 36.0 N 73 30.0 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	9.5	9.4	24.020	24.018	36.548	24.810	5.07	-
2	15.2	15.1	23.860	23.857	36.583	24.884	5.16	-
3	31.3	31.1	22.590	22.584	36.701	25.344	5.29	-
4	49.0	48.6	21.770	21.760	36.682	25.563	5.38	-
5	70.0	69.5	20.960	20.946	36.681	25.787	5.31	-
6	91.6	90.9	20.230	20.213	36.634	25.949	5.24	-
7	117.7	116.8	19.750	19.728	36.628	26.072	5.26	-
8	132.8	131.8	19.560	19.536	36.641	26.132	4.83	-
9	160.7	159.4	19.080	19.051	36.592	26.219	4.96	-
10	194.8	193.2	18.680	18.645	36.569	26.304	4.89	-
11	250.7	248.7	18.260	18.216	36.540	26.388	4.75	-
12	360.2	357.2	17.830	17.768	36.501	26.466	4.89	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
9.4	0.10	1.55	0.08	0.15	0.35	0.042	0.016
15.1	0.14	1.37	0.08	0.15	0.42	0.041	0.019
31.1	0.37	1.51	0.08	0.16	1.25	0.052	0.026
48.6	0.05	1.44	0.08	0.14	0.29	0.109	0.087
69.5	0.07	1.44	0.08	0.15	0.35	0.164	0.322
90.9	0.20	1.40	0.12	0.18	0.76	0.112	0.241
116.8	0.22	1.40	0.32	0.25	0.46	0.066	0.197
131.8	0.12	1.48	1.20	0.18	0.32	0.028	0.060
159.4	0.12	1.55	1.68	0.16	0.34	0.011	0.020
193.2	0.19	1.80	2.40	0.16	0.54	0.001	0.010
248.7	0.14	2.05	3.52	0.16	0.31	0.001	0.004
357.2	0.17	2.16	4.28	0.17	0.27	-	-

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
9.4	77.8	2.9	3.84	2.82	1.02	31.7	-
15.1	81.1	2.5	15.97	11.02	4.95	58.2	-
31.1	75.2	2.0	17.86	16.13	1.72	59.4	-
48.6	74.5	1.7	14.13	9.71	4.41	57.3	-
69.5	74.2	1.7	20.30	14.87	5.43	52.5	-
90.9	75.4	1.5	14.07	9.46	4.61	48.6	-
116.8	88.1	1.4	13.97	8.44	5.53	45.9	-
131.8	84.6	1.2	13.03	6.89	6.14	60.9	-
159.4	73.4	0.8	13.34	7.82	5.53	52.2	-
193.2	74.1	0.7	16.28	5.09	11.19	51.0	-
248.7	73.1	0.6	11.26	4.20	7.06	50.4	-
357.2	100.6	0.7	13.86	4.53	9.34	38.6	-

# USNS LYNCH 710-82 N. ATLANTIC

STATION 21 CAST 4 24 JUNE 1982 1035 GMT

POSITION 35 21.1 N 73 47.7 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	7.4	7.3	26.640	26.638	36.219	23.753	4.66	-
2	31.0	30.8	26.620	26.613	36.219	23.760	4.67	-
3	55.1	54.7	24.910	24.898	36.423	24.446	4.94	-
4	71.0	70.5	23.510	23.495	36.557	24.968	5.04	-
5	79.5	78.9	23.078	23.062	36.621	25.143	5.11	-
6	103.6	102.8	21.109	21.089	36.603	25.686	4.90	-
7	199.0	197.4	19.041	19.005	36.596	26.232	4.58	-
8	372.0	368.9	17.340	17.277	36.380	26.493	3.85	-
9	542.6	537.8	14.850	14.767	35.980	26.762	3.94	-
10	738.5	731.7	9.170	9.086	35.157	27.214	3.03	-
11	950.0	940.8	6.170	6.082	35.086	27.599	4.70	-
12	1097.0	1086.0	4.940	4.847	35.017	27.696	5.54	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
7.3	0.03	2.02	0.11	0.14	0.48	0.085	0.055
30.8	0.03	1.94	0.11	0.14	0.28	0.108	0.046
54.7	0.03	1.44	0.11	0.14	0.30	0.120	0.118
70.5	0.03	1.37	0.11	0.14	0.34	0.121	0.116
78.9	0.08	1.40	0.16	0.17	1.61	0.049	0.238
102.8	0.07	1.33	0.54	0.22	1.01	0.060	0.108
197.4	0.07	1.80	2.88	0.15	0.53	0.022	0.058
368.9	0.34	3.78	11.40	0.14	0.98	0.005	0.011
537.8	0.59	5.65	16.60	0.14	0.42	0.001	0.005
731.7	1.56	17.60	26.00	0.14	0.26	0.001	0.006
940.8	1.13	15.40	21.20	0.14	0.39	0.001	0.004
1086.0	1.24	13.80	19.40	0.14	0.27	-	-

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
7.3	98.2	3.5	24.49	18.94	5.55	43.5	-
30.8	90.4	1.9	15.92	10.65	5.26	46.1	-
54.7	96.0	2.4	18.40	13.31	5.09	50.8	-
70.5	72.7	2.5	18.48	12.01	6.47	43.3	-
78.9	81.3	2.2	26.31	19.38	6.94	80.1	-
102.8	77.5	1.5	21.51	12.97	8.54	51.4	-
197.4	76.5	0.9	4.01	2.54	1.46	54.4	-
368.9	67.8	0.6	2.73	0.41	2.32	42.2	-
537.8	50.8	0.5	2.85	0.80	2.04	43.2	-
731.7	49.5	0.3	6.95	1.12	5.84	16.5	-
940.8	52.5	0.7	3.35	0.49	2.86	6.9	-
1086.0	57.2	0.5	5.69	1.19	4.50	43.8	-

# USNS LYNCH 710-82 N. ATLANTIC

STATION 22

CAST 1

24 JUNE 1982

2025 GMT

POSITION 35 59.7 N 74 55.1 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
7	9.0	8.9	19.180	19.178	31.318	22.166	5.88	-
8	18.0	17.9	15.662	15.659	32.538	23.931	6.57	-
9	39.1	38.8	12.570	12.565	34.026	25.724	6.37	-
10	46.3	45.9	12.554	12.548	34.621	26.188	5.18	-
11	56.6	56.2	11.866	11.859	34.965	26.588	5.08	-
12	68.8	68.3	12.018	12.009	35.145	26.699	5.01	-

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
8.9	0.09	1.31	0.08	0.12	0.38	0.213	0.123
17.9	0.19	2.24	0.05	0.12	0.21	0.213	0.126
38.8	0.25	2.62	0.14	0.14	0.27	1.533	0.572
45.9	0.41	3.74	4.49	0.40	0.34	0.299	0.160
56.2	0.58	5.50	9.90	0.22	0.23	0.109	0.066
68.3	0.60	5.61	10.90	0.19	0.34	0.109	0.080

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
8.9	135.7	6.5	78.50	62.58	15.92	163.0	-
17.9	104.7	7.7	% 151.4	% 141.96	9.45	185.0	-
38.8	81.2	22.1	-	-	8.26	333.5	-
45.9	88.0	5.2	85.36	79.64	5.72	672.0	-
56.2	76.6	3.2	36.04	33.30	2.74	833.5	-
68.3	93.4	3.4	53.62	50.32	3.30	652.5	-

# USNS LYNCH 710-82 N. ATLANTIC

STATION 22 CAST 2 24 JUNE 1982 2005 GMT

POSITION 36 00.0 N 74 54.0 W

BOTTLE NO.	PRESS dbars	DEPTH M	TEMP DEG C	POT TEMP DEG C	SALINITY o/oo	SIGMA THETA	OXYGEN mL/L	TSM ug/L
1	11.4	11.3	18.888	18.886	31.429	22.323	5.83	287
2	20.1	19.9	14.562	14.559	32.964	24.497	6.39	107
3	36.5	36.2	14.214	14.209	34.417	25.692	5.66	191
4	47.9	47.5	13.370	13.363	34.950	26.280	4.96	89
5	61.5	61.0	11.910	11.902	35.128	26.706	5.08	99
6	63.5	63.0	11.960	11.952	35.188	26.743	4.98	127

DEPTH M	PHOSPHATE uM	SILICATE uM	NITRATE uM	NITRITE uM	AMMONIA uM	CHLOROPHYLL mg/L	PHAEOPHYTIN mg/L
11.3	0.11	1.38	0.05	0.12	0.21	0.273	0.098
19.9	0.18	1.57	0.05	0.11	0.20	0.230	0.162
36.2	0.27	2.73	0.92	0.31	0.34	0.836	0.448
47.5	0.63	5.24	8.60	0.30	0.22	0.153	0.113
61.0	0.74	5.76	11.00	0.21	0.32	0.093	0.068
63.0	0.76	6.54	11.60	0.32	0.29	0.131	0.100

DEPTH M	DOC ugC/L	POC ugC/L	TOTAL ATP ng/L	>2um ATP ng/L	<2um ATP ng/L	METHANE nL/L	NITROUS OXIDE nL/L
11.3	143.2	6.0	-	-	-	170.0	-
19.9	93.5	6.5	-	-	-	126.5	-
36.2	111.8	10.9	-	-	-	386.0	-
47.5	85.8	5.4	-	-	-	941.5	-
61.0	77.1	4.8	-	-	-	784.5	-
63.0	89.8	3.1	-	-	-	692.5	-



APPENDIX B: CAST NOTES OF UNUSUAL OCCURRENCES AND CORRECTIVE MEASURES  
TAKEN, USNS LYNCH, CRUISE 710-82

STATION	CAST	COMMENT
1	1	: Bottle 1 pretripped.
4	3	: Bottles 6 and 7 were cross cocked. No samples were collected from those bottles. Salinity bottles for Niskins 9-12 were sampled out of order. Analyzed data from bottle 9 was recorded from bottle 12. Bottles 10, 11 and 12 were recorded as 9, 10 and 11, respectively. Correct data are reported in the station data table.
8	1	: Autosol salinities from bottles 9-12 were off by 7-9 ppm. CTD salinities are reported for these samples. Bottle salinities were 9: 35.154, 10: 35.117, 11: 35.081 and 12: 35.008.
9	1A	: Bottles 11 and 12 tripped together at 200.5 - 200.8 dbar.
9	2C	: All bottles were racked in reverse order on this cast. Bottle 12 was near surface and bottle 1 was deepest.
11	1A	: ATP values reported are for <2 $\mu$ m fraction and 2-20 $\mu$ m fraction. 20-200 $\mu$ m fraction and total ATP were not measured due to loss of samples.
11	2A	: See NOTE for 11-1A.
17	2	: Based on salinity and nutrient data, bottles 11 and 12 must have tripped simultaneously at 2000 dbar. All bottles above 11 were tripped at one depth lower than anticipated when the cast was done. Correct depths are reported.
18	1	: Based on salinity and nutrient data, bottles 11 and 12 tripped simultaneously at 502 dbar and bottles 4 and 5 tripped together at 79 dbar. All other bottle depths and temperatures have been corrected for correct trip depths accordingly.
18	3	: All bottles were racked in reverse order for this cast. Bottle 12 was near surface, and bottle 1 was deepest.

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